



SEQUENCE LISTING

<110> Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo  
ARIYASU, Toshio  
MATSUMOTO, Shuji  
KYONO, Fumiyo  
HANAYA, Toshiharu  
ARAI, Shigeyuki  
IKEDA, Masao  
KURIMOTO, Masashi

<120> TREHALOSE RECEPTOR AND METHOD FOR DETECTING TREHALOSE WITH THE  
SAME

<130> ARIYASU2

<140> 10/663,650

<141> 2003-09-17

<160> 24

<170> PatentIn version 3.3

<210> 1

<211> 374

<212> PRT

<213> Homo sapiens

<220>

<221> misc\_feature

<223> GENBANK Accession no. M80632

<400> 1

Met Ala Arg Ser Leu Thr Trp Gly Cys Cys Pro Trp Cys Leu Thr Glu  
1 5 10 15

Glu Glu Lys Thr Ala Ala Arg Ile Asp Gln Glu Ile Asn Arg Ile Leu  
20 25 30

Leu Glu Gln Lys Lys Gln Glu Arg Glu Glu Leu Lys Leu Leu Leu Leu  
35 40 45

Gly Pro Gly Glu Ser Gly Lys Ser Thr Phe Ile Lys Gln Met Arg Ile  
50 55 60

Ile His Gly Val Gly Tyr Ser Glu Glu Asp Arg Arg Ala Phe Arg Leu  
65 70 75 80

Leu Ile Tyr Gln Asn Ile Phe Val Ser Met Gln Ala Met Ile Asp Ala  
85 90 95

Met Asp Arg Leu Gln Ile Pro Phe Ser Arg Pro Asp Ser Lys Gln His  
 100 105 110

Ala Ser Leu Val Met Thr Gln Asp Pro Tyr Lys Val Ser Thr Phe Glu  
 115 120 125

Lys Pro Tyr Ala Val Ala Met Gln Tyr Leu Trp Arg Asp Ala Gly Ile  
 130 135 140

Arg Ala Cys Tyr Glu Arg Arg Arg Glu Phe His Leu Leu Asp Ser Ala  
 145 150 155 160

Val Tyr Tyr Leu Ser His Leu Glu Arg Ile Ser Glu Asp Ser Tyr Ile  
 165 170 175

Pro Thr Ala Gln Asp Val Leu Arg Ser Arg Met Pro Thr Thr Gly Ile  
 180 185 190

Asn Glu Tyr Cys Phe Ser Val Lys Lys Thr Lys Leu Arg Ile Val Asp  
 195 200 205

Val Gly Gly Gln Arg Ser Glu Arg Arg Lys Trp Ile His Cys Phe Glu  
 210 215 220

Asn Val Ile Ala Leu Ile Tyr Leu Ala Ser Leu Ser Glu Tyr Asp Gln  
 225 230 235 240

Cys Leu Glu Glu Asn Asp Gln Glu Asn Arg Met Glu Glu Ser Leu Ala  
 245 250 255

Leu Phe Ser Thr Ile Leu Glu Leu Pro Trp Phe Lys Ser Thr Ser Val  
 260 265 270

Ile Leu Phe Leu Asn Lys Thr Asp Ile Leu Glu Asp Lys Ile His Thr  
 275 280 285

Ser His Leu Ala Thr Tyr Phe Pro Ser Phe Gln Gly Pro Arg Arg Asp  
 290 295 300

Ala Glu Ala Ala Lys Ser Phe Ile Leu Asp Met Tyr Ala Arg Val Tyr  
 305 310 315 320

Ala Ser Cys Ala Glu Pro Gln Asp Gly Gly Arg Lys Gly Ser Arg Ala



Lys Arg Tyr Ala Ala Ala Met Gln Trp Leu Trp Arg Asp Ala Gly Ile  
130 135 140

Arg Ala Cys Tyr Glu Arg Arg Arg Glu Phe His Leu Leu Asp Ser Ala  
145 150 155 160

Val Tyr Tyr Leu Ser His Leu Glu Arg Ile Thr Glu Glu Gly Tyr Val  
165 170 175

Pro Thr Ala Gln Asp Val Leu Arg Ser Arg Met Pro Thr Thr Gly Ile  
180 185 190

Asn Glu Tyr Cys Phe Ser Val Gln Lys Thr Asn Leu Arg Ile Val Asp  
195 200 205

Val Gly Gly Gln Lys Ser Glu Arg Lys Lys Trp Ile His Cys Phe Glu  
210 215 220

Asn Val Ile Ala Leu Ile Tyr Leu Ala Ser Leu Ser Glu Tyr Asp Gln  
225 230 235 240

Cys Leu Glu Glu Asn Asn Gln Glu Asn Arg Met Lys Glu Ser Leu Ala  
245 250 255

Leu Phe Gly Thr Ile Leu Glu Leu Pro Trp Phe Lys Ser Thr Ser Val  
260 265 270

Ile Leu Phe Leu Asn Lys Thr Asp Ile Leu Glu Glu Lys Ile Pro Thr  
275 280 285

Ser His Leu Ala Thr Tyr Phe Pro Ser Phe Gln Gly Pro Lys Gln Asp  
290 295 300

Ala Glu Ala Ala Lys Arg Phe Ile Leu Asp Met Tyr Thr Arg Met Tyr  
305 310 315 320

Thr Gly Cys Val Asp Gly Pro Glu Gly Ser Lys Lys Gly Ala Arg Ser  
325 330 335

Arg Arg Leu Phe Ser His Tyr Thr Cys Ala Thr Asp Thr Gln Asn Ile  
340 345 350

Arg Lys Val Phe Lys Asp Val Arg Asp Ser Val Leu Ala Arg Tyr Leu

355                                      360                                      365  
 Asp Glu Ile Asn Leu Leu  
 370  
  
 <210> 3  
 <211> 355  
 <212> PRT  
 <213> Homo sapiens  
  
 <220>  
 <221> misc\_feature  
 <223> GENBANK Accession no. NM\_002073  
  
 <400> 3  
  
 Met Gly Cys Arg Gln Ser Ser Glu Glu Lys Glu Ala Ala Arg Arg Ser  
 1                                      5                                      10                                      15  
  
 Arg Arg Ile Asp Arg His Leu Arg Ser Glu Ser Gln Arg Gln Arg Arg  
                                     20                                      25                                      30  
  
 Glu Ile Lys Leu Leu Leu Leu Gly Thr Ser Asn Ser Gly Lys Ser Thr  
                                     35                                      40                                      45  
  
 Ile Val Lys Gln Met Lys Ile Ile His Ser Gly Gly Phe Asn Leu Glu  
                                     50                                      55                                      60  
  
 Ala Cys Lys Glu Tyr Lys Pro Leu Ile Ile Tyr Asn Ala Ile Asp Ser  
 65                                      70                                      75                                      80  
  
 Leu Thr Arg Ile Ile Arg Ala Leu Ala Ala Leu Arg Ile Asp Phe His  
                                     85                                      90                                      95  
  
 Asn Pro Asp Arg Ala Tyr Asp Ala Val Gln Leu Phe Ala Leu Thr Gly  
                                     100                                      105                                      110  
  
 Pro Ala Glu Ser Lys Gly Glu Ile Thr Pro Glu Leu Leu Gly Val Met  
                                     115                                      120                                      125  
  
 Arg Arg Leu Trp Ala Asp Pro Gly Ala Gln Ala Cys Phe Ser Arg Ser  
                                     130                                      135                                      140  
  
 Ser Glu Tyr His Leu Glu Asp Asn Ala Ala Tyr Tyr Leu Asn Asp Leu  
 145                                      150                                      155                                      160

Glu Arg Ile Ala Ala Ala Asp Tyr Ile Pro Thr Val Glu Asp Ile Leu  
165 170 175

Arg Ser Arg Asp Met Thr Thr Gly Ile Val Glu Asn Lys Phe Thr Phe  
180 185 190

Lys Glu Leu Thr Phe Lys Met Val Asp Val Gly Gly Gln Arg Ser Glu  
195 200 205

Arg Lys Lys Trp Ile His Cys Phe Glu Gly Val Thr Ala Ile Ile Phe  
210 215 220

Cys Val Glu Leu Ser Gly Tyr Asp Leu Lys Leu Tyr Glu Asp Asn Gln  
225 230 235 240

Thr Ser Arg Met Ala Glu Ser Leu Arg Leu Phe Asp Ser Ile Cys Asn  
245 250 255

Asn Asn Trp Phe Ile Asn Thr Ser Leu Ile Leu Phe Leu Asn Lys Lys  
260 265 270

Asp Leu Leu Ala Glu Lys Ile Arg Arg Ile Pro Leu Thr Ile Cys Phe  
275 280 285

Pro Glu Tyr Lys Gly Gln Asn Thr Tyr Glu Glu Ala Ala Val Tyr Ile  
290 295 300

Gln Arg Gln Phe Glu Asp Leu Asn Arg Asn Lys Glu Thr Lys Glu Ile  
305 310 315 320

Tyr Ser His Phe Thr Cys Ala Thr Asp Thr Ser Asn Ile Gln Phe Val  
325 330 335

Phe Asp Ala Val Thr Asp Val Ile Ile Gln Asn Asn Leu Lys Tyr Ile  
340 345 350

Gly Leu Cys  
355

<210> 4  
<211> 374  
<212> PRT  
<213> Artificial

<220>  
 <223> Synthetic  
  
 <300>  
 <301> SEJAL M. MODY, MAURICE K. C. HO, SUSHMA A. JOSHI, and YUNG H. WONG  
 <302> Incorporation of GalphaZ-Specific Sequence at the Carboxyl Terminus Increases the Promiscuity of Galpha16 toward Gi-Coupled Receptors  
 <303> The American Society for Pharmacology and Experimental Therapeutics  
 <304> 57  
 <306> 13-23  
 <307> 2000  
  
 <400> 4

Met Ala Arg Ser Leu Thr Trp Arg Cys Cys Pro Trp Cys Leu Thr Glu  
 1 5 10 15

Asp Glu Lys Ala Ala Ala Arg Val Asp Gln Glu Ile Asn Arg Ile Leu  
 20 25 30

Leu Glu Gln Lys Lys Gln Asp Arg Gly Glu Leu Lys Leu Leu Leu Leu  
 35 40 45

Gly Pro Gly Glu Ser Gly Lys Ser Thr Phe Ile Lys Gln Met Arg Ile  
 50 55 60

Ile His Gly Ala Gly Tyr Ser Glu Glu Glu Arg Lys Gly Phe Arg Pro  
 65 70 75 80

Leu Val Tyr Gln Asn Ile Phe Val Ser Met Arg Ala Met Ile Glu Ala  
 85 90 95

Met Glu Arg Leu Gln Ile Pro Phe Ser Arg Pro Glu Ser Lys His His  
 100 105 110

Ala Ser Leu Val Met Ser Gln Asp Pro Tyr Lys Val Thr Thr Phe Glu  
 115 120 125

Lys Arg Tyr Ala Ala Ala Met Gln Trp Leu Trp Arg Asp Ala Gly Ile  
 130 135 140

Arg Ala Cys Tyr Glu Arg Arg Arg Glu Phe His Leu Leu Asp Ser Ala  
 145 150 155 160

Val Tyr Tyr Leu Ser His Leu Glu Arg Ile Thr Glu Glu Gly Tyr Val

|   |     |     |
|---|-----|-----|
| 165   | 170 | 175 |
| Pro Thr Ala Gln Asp Val Leu Arg Ser Arg Met Pro Thr Thr Gly Ile |     |     |
| 180   | 185 | 190 |
| Asn Glu Tyr Cys Phe Ser Val Gln Lys Thr Asn Leu Arg Ile Val Asp |     |     |
| 195   | 200 | 205 |
| Val Gly Gly Gln Lys Ser Glu Arg Lys Lys Trp Ile His Cys Phe Glu |     |     |
| 210   | 215 | 220 |
| Asn Val Ile Ala Leu Ile Tyr Leu Ala Ser Leu Ser Glu Tyr Asp Gln |     |     |
| 225   | 230 | 235 |
| Cys Leu Glu Glu Asn Asn Gln Glu Asn Arg Met Lys Glu Ser Leu Ala |     |     |
| 245   | 250 | 255 |
| Leu Phe Gly Thr Ile Leu Glu Leu Pro Trp Phe Lys Ser Thr Ser Val |     |     |
| 260   | 265 | 270 |
| Ile Leu Phe Leu Asn Lys Thr Asp Ile Leu Glu Glu Lys Ile Pro Thr |     |     |
| 275   | 280 | 285 |
| Ser His Leu Ala Thr Tyr Phe Pro Ser Phe Gln Gly Pro Lys Gln Asp |     |     |
| 290   | 295 | 300 |
| Ala Glu Ala Ala Lys Arg Phe Ile Leu Asp Met Tyr Thr Arg Met Tyr |     |     |
| 305   | 310 | 315 |
| Thr Gly Cys Val Asp Gly Pro Glu Gly Ser Asn Arg Asn Lys Glu Thr |     |     |
| 325   | 330 | 335 |
| Lys Glu Ile Tyr Ser His Phe Thr Cys Ala Thr Asp Thr Ser Asn Ile |     |     |
| 340   | 345 | 350 |
| Gln Phe Val Phe Asp Ala Val Thr Asp Val Ile Ile Gln Asn Asn Leu |     |     |
| 355   | 360 | 365 |
| Lys Tyr Ile Gly Leu Cys   |     |     |
| 370   |     |     |

<210> 5  
 <211> 858  
 <212> PRT



<213> Mus musculus

<400> 5

Met Pro Ala Leu Ala Ile Met Gly Leu Ser Leu Ala Ala Phe Leu Glu  
1 5 10 15

Leu Gly Met Gly Ala Ser Leu Cys Leu Ser Gln Gln Phe Lys Ala Gln  
20 25 30

Gly Asp Tyr Ile Leu Gly Gly Leu Phe Pro Leu Gly Ser Thr Glu Glu  
35 40 45

Ala Thr Leu Asn Gln Arg Thr Gln Pro Asn Ser Ile Pro Cys Asn Arg  
50 55 60

Phe Ser Pro Leu Gly Leu Phe Leu Ala Met Ala Met Lys Met Ala Val  
65 70 75 80

Glu Glu Ile Asn Asn Gly Ser Ala Leu Leu Pro Gly Leu Arg Leu Gly  
85 90 95

Tyr Asp Leu Phe Asp Thr Cys Ser Glu Pro Val Val Thr Met Lys Ser  
100 105 110

Ser Leu Met Phe Leu Ala Lys Val Gly Ser Gln Ser Ile Ala Ala Tyr  
115 120 125

Cys Asn Tyr Thr Gln Tyr Gln Pro Arg Val Leu Ala Val Ile Gly Pro  
130 135 140

His Ser Ser Glu Leu Ala Leu Ile Thr Gly Lys Phe Phe Ser Phe Phe  
145 150 155 160

Leu Met Pro Gln Val Ser Tyr Ser Ala Ser Met Asp Arg Leu Ser Asp  
165 170 175

Arg Glu Thr Phe Pro Ser Phe Phe Arg Thr Val Pro Ser Asp Arg Val  
180 185 190

Gln Leu Gln Ala Val Val Thr Leu Leu Gln Asn Phe Ser Trp Asn Trp  
195 200 205

Val Ala Ala Leu Gly Ser Asp Asp Asp Tyr Gly Arg Glu Gly Leu Ser  
210 215 220

Ile Phe Ser Ser Leu Ala Asn Ala Arg Gly Ile Cys Ile Ala His Glu  
 225 230 235 240

Gly Leu Val Pro Gln His Asp Thr Ser Gly Gln Gln Leu Gly Lys Val  
 245 250 255

Leu Asp Val Leu Arg Gln Val Asn Gln Ser Lys Val Gln Val Val Val  
 260 265 270

Leu Phe Ala Ser Ala Arg Ala Val Tyr Ser Leu Phe Ser Tyr Ser Ile  
 275 280 285

His His Gly Leu Ser Pro Lys Val Trp Val Ala Ser Glu Ser Trp Leu  
 290 295 300

Thr Ser Asp Leu Val Met Thr Leu Pro Asn Ile Ala Arg Val Gly Thr  
 305 310 315 320

Val Leu Gly Phe Leu Gln Arg Gly Ala Leu Leu Pro Glu Phe Ser His  
 325 330 335

Tyr Val Glu Thr His Leu Ala Leu Ala Ala Asp Pro Ala Phe Cys Ala  
 340 345 350

Ser Leu Asn Ala Glu Leu Asp Leu Glu Glu His Val Met Gly Gln Arg  
 355 360 365

Cys Pro Arg Cys Asp Asp Ile Met Leu Gln Asn Leu Ser Ser Gly Leu  
 370 375 380

Leu Gln Asn Leu Ser Ala Gly Gln Leu His His Gln Ile Phe Ala Thr  
 385 390 395 400

Tyr Ala Ala Val Tyr Ser Val Ala Gln Ala Leu His Asn Thr Leu Gln  
 405 410 415

Cys Asn Val Ser His Cys His Val Ser Glu His Val Leu Pro Trp Gln  
 420 425 430

Leu Leu Glu Asn Met Tyr Asn Met Ser Phe His Ala Arg Asp Leu Thr  
 435 440 445

Leu Gln Phe Asp Ala Glu Gly Asn Val Asp Met Glu Tyr Asp Leu Lys  
 450 455 460

Met Trp Val Trp Gln Ser Pro Thr Pro Val Leu His Thr Val Gly Thr  
 465 470 475 480

Phe Asn Gly Thr Leu Gln Leu Gln Gln Ser Lys Met Tyr Trp Pro Gly  
 485 490 495

Asn Gln Val Pro Val Ser Gln Cys Ser Arg Gln Cys Lys Asp Gly Gln  
 500 505 510

Val Arg Arg Val Lys Gly Phe His Ser Cys Cys Tyr Asp Cys Val Asp  
 515 520 525

Cys Lys Ala Gly Ser Tyr Arg Lys His Pro Asp Asp Phe Thr Cys Thr  
 530 535 540

Pro Cys Asn Gln Asp Gln Trp Ser Pro Glu Lys Ser Thr Ala Cys Leu  
 545 550 555 560

Pro Arg Arg Pro Lys Phe Leu Ala Trp Gly Glu Pro Val Val Leu Ser  
 565 570 575

Leu Leu Leu Leu Leu Cys Leu Val Leu Gly Leu Ala Leu Ala Ala Leu  
 580 585 590

Gly Leu Ser Val His His Trp Asp Ser Pro Leu Val Gln Ala Ser Gly  
 595 600 605

Gly Ser Gln Phe Cys Phe Gly Leu Ile Cys Leu Gly Leu Phe Cys Leu  
 610 615 620

Ser Val Leu Leu Phe Pro Gly Arg Pro Ser Ser Ala Ser Cys Leu Ala  
 625 630 635 640

Gln Gln Pro Met Ala His Leu Pro Leu Thr Gly Cys Leu Ser Thr Leu  
 645 650 655

Phe Leu Gln Ala Ala Glu Thr Phe Val Glu Ser Glu Leu Pro Leu Ser  
 660 665 670

Trp Ala Asn Trp Leu Cys Ser Tyr Leu Arg Gly Leu Trp Ala Trp Leu  
 675 680 685

Val Val Leu Leu Ala Thr Phe Val Glu Ala Ala Leu Cys Ala Trp Tyr  
690 695 700

Leu Asn Ala Phe Pro Pro Glu Val Val Thr Asp Trp Ser Val Leu Pro  
705 710 715 720

Thr Glu Val Leu Glu His Cys His Val Arg Ser Trp Val Ser Leu Gly  
725 730 735

Leu Val His Ile Thr Asn Ala Met Leu Ala Phe Leu Cys Phe Leu Gly  
740 745 750

Thr Phe Leu Val Gln Ser Gln Pro Gly Arg Tyr Asn Arg Ala Arg Gly  
755 760 765

Leu Thr Phe Ala Met Leu Ala Tyr Phe Ile Thr Trp Val Ser Phe Val  
770 775 780

Pro Leu Leu Ala Asn Val Gln Val Ala Tyr Gln Pro Ala Val Gln Met  
785 790 795 800

Gly Ala Ile Leu Val Cys Ala Leu Gly Ile Leu Val Thr Phe His Leu  
805 810 815

Pro Lys Cys Tyr Val Leu Leu Trp Leu Pro Lys Leu Asn Thr Gln Glu  
820 825 830

Phe Phe Leu Gly Arg Asn Ala Lys Lys Ala Ala Asp Glu Asn Ser Gly  
835 840 845

Gly Gly Glu Ala Ala Gln Gly His Asn Glu  
850 855

<210> 6  
<211> 1353  
<212> DNA  
<213> Mus musculus

<220>  
<221> misc\_feature  
<223> GENBANK Accession no. M80632

<220>  
<221> CDS

<222> (43)..(1164)

<400> 6

```
caggccctgt gatgtcacct ggtggtctgt gaagcgccca cc atg gcc cgg tcc      54
                               Met Ala Arg Ser
                               1

ctg act tgg ggc tgc tgt ccc tgg tgc ctg aca gag gag gag aag act      102
Leu Thr Trp Gly Cys Cys Pro Trp Cys Leu Thr Glu Glu Glu Lys Thr
5                               10                               15                               20

gcc gcc aga atc gac cag gag atc aac agg att ttg ttg gaa cag aaa      150
Ala Ala Arg Ile Asp Gln Glu Ile Asn Arg Ile Leu Leu Glu Gln Lys
25                               30                               35

aaa caa gag cgc gag gaa ttg aaa ctc ctg ctg ttg ggg cct ggt gag      198
Lys Gln Glu Arg Glu Glu Leu Lys Leu Leu Leu Leu Gly Pro Gly Glu
40                               45                               50

agc ggg aag agt acg ttc atc aag cag atg cgc atc att cac ggt gtg      246
Ser Gly Lys Ser Thr Phe Ile Lys Gln Met Arg Ile Ile His Gly Val
55                               60                               65

ggc tac tcg gag gag gac cgc aga gcc ttc cgg ctg ctc atc tac cag      294
Gly Tyr Ser Glu Glu Asp Arg Arg Ala Phe Arg Leu Leu Ile Tyr Gln
70                               75                               80

aac atc ttc gtc tcc atg cag gcc atg ata gat gcg atg gac cgg ctg      342
Asn Ile Phe Val Ser Met Gln Ala Met Ile Asp Ala Met Asp Arg Leu
85                               90                               95                               100

cag atc ccc ttc agc agg cct gac agc aag cag cac gcc agc cta gtg      390
Gln Ile Pro Phe Ser Arg Pro Asp Ser Lys Gln His Ala Ser Leu Val
105                               110                               115

atg acc cag gac ccc tat aaa gtg agc aca ttc gag aag cca tat gca      438
Met Thr Gln Asp Pro Tyr Lys Val Ser Thr Phe Glu Lys Pro Tyr Ala
120                               125                               130

gtg gcc atg cag tac ctg tgg cgg gac gcg ggc atc cgt gca tgc tac      486
Val Ala Met Gln Tyr Leu Trp Arg Asp Ala Gly Ile Arg Ala Cys Tyr
135                               140                               145

gag cga agg cgt gaa ttc cac ctt ctg gac tcc gcg gtg tat tac ctg      534
Glu Arg Arg Arg Glu Phe His Leu Leu Asp Ser Ala Val Tyr Tyr Leu
150                               155                               160

tca cac ctg gag cgc ata tca gag gac agc tac atc ccc act gcg caa      582
Ser His Leu Glu Arg Ile Ser Glu Asp Ser Tyr Ile Pro Thr Ala Gln
165                               170                               175                               180

gac gtg ctg cgc agt cgc atg ccc acc aca ggc atc aat gag tac tgc      630
Asp Val Leu Arg Ser Arg Met Pro Thr Thr Gly Ile Asn Glu Tyr Cys
185                               190                               195

ttc tcc gtg aag aaa acc aaa ctg cgc atc gtg gat gtt ggt ggc cag      678
Phe Ser Val Lys Lys Thr Lys Leu Arg Ile Val Asp Val Gly Gly Gln
200                               205                               210
```

|  |      |
|--|------|
| agg tca gag cgt agg aaa tgg att cac tgt ttc gag aac gtg att gcc    | 726  |
| Arg Ser Glu Arg Arg Lys Trp Ile His Cys Phe Glu Asn Val Ile Ala    |      |
| 215 220 225  |      |
| ctc atc tac ctg gcc tcc ctg agc gag tat gac cag tgc cta gag gag    | 774  |
| Leu Ile Tyr Leu Ala Ser Leu Ser Glu Tyr Asp Gln Cys Leu Glu Glu    |      |
| 230 235 240  |      |
| aac gat cag gag aac cgc atg gag gag agt ctc gct ctg ttc agc acg    | 822  |
| Asn Asp Gln Glu Asn Arg Met Glu Glu Ser Leu Ala Leu Phe Ser Thr    |      |
| 245 250 255 260  |      |
| atc cta gag ctg ccc tgg ttc aag agc acc tcg gtc atc ctc ttc ctc    | 870  |
| Ile Leu Glu Leu Pro Trp Phe Lys Ser Thr Ser Val Ile Leu Phe Leu    |      |
| 265 270 275  |      |
| aac aag acg gac atc ctg gaa gat aag att cac acc tcc cac ctg gcc    | 918  |
| Asn Lys Thr Asp Ile Leu Glu Asp Lys Ile His Thr Ser His Leu Ala    |      |
| 280 285 290  |      |
| aca tac ttc ccc agc ttc cag gga ccc cgg cga gac gca gag gcc gcc    | 966  |
| Thr Tyr Phe Pro Ser Phe Gln Gly Pro Arg Arg Asp Ala Glu Ala Ala    |      |
| 295 300 305  |      |
| aag agc ttc atc ttg gac atg tat gcg cgc gtg tac gcg agc tgc gca    | 1014 |
| Lys Ser Phe Ile Leu Asp Met Tyr Ala Arg Val Tyr Ala Ser Cys Ala    |      |
| 310 315 320  |      |
| gag ccc cag gac ggt ggc agg aaa ggc tcc cgc gcg cgc cgc ttc ttc    | 1062 |
| Glu Pro Gln Asp Gly Arg Lys Gly Ser Arg Ala Arg Arg Phe Phe        |      |
| 325 330 335 340  |      |
| gca cac ttc acc tgt gcc acg gac acg caa agc gtc cgc agc gtg ttc    | 1110 |
| Ala His Phe Thr Cys Ala Thr Asp Thr Gln Ser Val Arg Ser Val Phe    |      |
| 345 350 355  |      |
| aag gac gtg cgg gac tcg gtg ctg gcc cgg tac ctg gac gag atc aac    | 1158 |
| Lys Asp Val Arg Asp Ser Val Leu Ala Arg Tyr Leu Asp Glu Ile Asn    |      |
| 360 365 370  |      |
| ctg ctg tgacgcggga cagggaaccc caagcgcgac gcgtcgtggc gaggacatac     | 1214 |
| Leu Leu  |      |
| ctccccctgg tggccgcgcg tggaactgca ggtccaggag ctgccaaagtg gggaagccag | 1274 |
| cccacaggag agagtcctgc ttctactggg cccaagcca gctcctgtaa ttattcctcg   | 1334 |
| ccttctctag tgttggaag   | 1353 |

<210> 7  
 <211> 29  
 <212> DNA  
 <213> Artificial  
 <220>

```

<223> Synthetic

<400> 7
cgcaagcttt ctgtgaagcg cccaccatg 29

<210> 8
<211> 37
<212> DNA
<213> Artificial

<220>
<223> Synthetic

<400> 8
gcattacgat gcggccgcgc gtcacagcag gttgatc 37

<210> 9
<211> 2060
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<223> GENBANK Accession no. M63904

<220>
<221> CDS
<222> (220)..(1341)

<400> 9
tggtcccagc actcaagcct tgccaccgcc gagccgggct tcctgggtgt ttcaggcaag 60
gaagtctagg tccctggggg gtgaccccca aggaaaaggc agcctccctg cgcacccggt 120
tgccccggagc cctctccagg gccggctggg ctggggggttg ccctggccag caggggccccg 180
ggggcgatgc cacccggtgc cgactgaggc caccgcacc atg gcc cgc tcg ctg 234
Met Ala Arg Ser Leu
1 5

acc tgg cgc tgc tgc ccc tgg tgc ctg acg gag gat gag aag gcc gcc 282
Thr Trp Arg Cys Cys Pro Trp Cys Leu Thr Glu Asp Glu Lys Ala Ala
10 15 20

gcc cgg gtg gac cag gag atc aac agg atc ctc ttg gag cag aag aag 330
Ala Arg Val Asp Gln Glu Ile Asn Arg Ile Leu Leu Glu Gln Lys Lys
25 30 35

cag gac cgc ggg gag ctg aag ctg ctg ctt ttg ggc cca ggc gag agc 378
Gln Asp Arg Gly Glu Leu Lys Leu Leu Leu Leu Gly Pro Gly Glu Ser
40 45 50

ggg aag agc acc ttc atc aag cag atg cgg atc atc cac ggc gcc ggc 426
Gly Lys Ser Thr Phe Ile Lys Gln Met Arg Ile Ile His Gly Ala Gly
55 60 65

```

|   |      |
|---|------|
| tac tgc gag gag gag cgc aag ggc ttc cgg ccc ctg gtc tac cag aac | 474  |
| Tyr Ser Glu Glu Glu Arg Lys Gly Phe Arg Pro Leu Val Tyr Gln Asn |      |
| 70 75 80 85   |      |
| atc ttc gtg tcc atg cgg gcc atg atc gag gcc atg gag cgg ctg cag | 522  |
| Ile Phe Val Ser Met Arg Ala Met Ile Glu Ala Met Glu Arg Leu Gln |      |
| 90 95 100   |      |
| att cca ttc agc agg ccc gag agc aag cac cac gct agc ctg gtc atg | 570  |
| Ile Pro Phe Ser Arg Pro Glu Ser Lys His His Ala Ser Leu Val Met |      |
| 105 110 115   |      |
| agc cag gac ccc tat aaa gtg acc acg ttt gag aag cgc tac gct gcg | 618  |
| Ser Gln Asp Pro Tyr Lys Val Thr Thr Phe Glu Lys Arg Tyr Ala Ala |      |
| 120 125 130   |      |
| gcc atg cag tgg ctg tgg agg gat gcc ggc atc cgg gcc tgc tat gag | 666  |
| Ala Met Gln Trp Leu Trp Arg Asp Ala Gly Ile Arg Ala Cys Tyr Glu |      |
| 135 140 145   |      |
| cgt cgg cgg gaa ttc cac ctg ctc gat tca gcc gtg tac tac ctg tcc | 714  |
| Arg Arg Arg Glu Phe His Leu Leu Asp Ser Ala Val Tyr Tyr Leu Ser |      |
| 150 155 160 165   |      |
| cac ctg gag cgc atc acc gag gag ggc tac gtc ccc aca gct cag gac | 762  |
| His Leu Glu Arg Ile Thr Glu Glu Gly Tyr Val Pro Thr Ala Gln Asp |      |
| 170 175 180   |      |
| gtg ctc cgc agc cgc atg ccc acc act ggc atc aac gag tac tgc ttc | 810  |
| Val Leu Arg Ser Arg Met Pro Thr Thr Gly Ile Asn Glu Tyr Cys Phe |      |
| 185 190 195   |      |
| tcc gtg cag aaa acc aac ctg cgg atc gtg gac gtc ggg ggc cag aag | 858  |
| Ser Val Gln Lys Thr Asn Leu Arg Ile Val Asp Val Gly Gly Gln Lys |      |
| 200 205 210   |      |
| tca gag cgt aag aaa tgg atc cat tgt ttc gag aac gtg atc gcc ctc | 906  |
| Ser Glu Arg Lys Lys Trp Ile His Cys Phe Glu Asn Val Ile Ala Leu |      |
| 215 220 225   |      |
| atc tac ctg gcc tca ctg agt gaa tac gac cag tgc ctg gag gag aac | 954  |
| Ile Tyr Leu Ala Ser Leu Ser Glu Tyr Asp Gln Cys Leu Glu Glu Asn |      |
| 230 235 240 245   |      |
| aac cag gag aac cgc atg aag gag agc ctc gca ttg ttt ggg act atc | 1002 |
| Asn Gln Glu Asn Arg Met Lys Glu Ser Leu Ala Leu Phe Gly Thr Ile |      |
| 250 255 260   |      |
| ctg gaa cta ccc tgg ttc aaa agc aca tcc gtc atc ctc ttt ctc aac | 1050 |
| Leu Glu Leu Pro Trp Phe Lys Ser Thr Ser Val Ile Leu Phe Leu Asn |      |
| 265 270 275   |      |
| aaa acc gac atc ctg gag gag aaa atc ccc acc tcc cac ctg gct acc | 1098 |
| Lys Thr Asp Ile Leu Glu Glu Lys Ile Pro Thr Ser His Leu Ala Thr |      |
| 280 285 290   |      |
| tat ttc ccc agt ttc cag ggc cct aag cag gat gct gag gca gcc aag | 1146 |



|            |            |             |            |            |            |     |     |     |     |     |     |     |     |     |     |      |
|------------|------------|-------------|------------|------------|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| Tyr        | Phe        | Pro         | Ser        | Phe        | Gln        | Gly | Pro | Lys | Gln | Asp | Ala | Glu | Ala | Ala | Lys |      |
| 295        |            |             |            |            |            | 300 |     |     |     |     | 305 |     |     |     |     |      |
| agg        | ttc        | atc         | ctg        | gac        | atg        | tac | acg | agg | atg | tac | acc | ggg | tgc | gtg | gac | 1194 |
| Arg        | Phe        | Ile         | Leu        | Asp        | Met        | Tyr | Thr | Arg | Met | Tyr | Thr | Gly | Cys | Val | Asp |      |
| 310        |            |             |            |            | 315        |     |     |     |     | 320 |     |     |     |     | 325 |      |
| ggc        | ccc        | gag         | ggc        | agc        | aag        | aag | ggc | gca | cga | tcc | cga | cgc | ctt | ttc | agc | 1242 |
| Gly        | Pro        | Glu         | Gly        | Ser        | Lys        | Lys | Gly | Ala | Arg | Ser | Arg | Arg | Leu | Phe | Ser |      |
|            |            |             |            | 330        |            |     |     |     | 335 |     |     |     |     | 340 |     |      |
| cac        | tac        | aca         | tgt        | gcc        | aca        | gac | aca | cag | aac | atc | cgc | aag | gtc | ttc | aag | 1290 |
| His        | Tyr        | Thr         | Cys        | Ala        | Thr        | Asp | Thr | Gln | Asn | Ile | Arg | Lys | Val | Phe | Lys |      |
|            |            |             |            | 345        |            |     |     | 350 |     |     |     |     | 355 |     |     |      |
| gac        | gtg        | cgg         | gac        | tcg        | gtg        | ctc | gcc | cgc | tac | ctg | gac | gag | atc | aac | ctg | 1338 |
| Asp        | Val        | Arg         | Asp        | Ser        | Val        | Leu | Ala | Arg | Tyr | Leu | Asp | Glu | Ile | Asn | Leu |      |
|            | 360        |             |            |            |            |     | 365 |     |     |     |     | 370 |     |     |     |      |
| ctg        | tgacccaggc | cccacctggg  | gcaggcggca | ccggcgggcg | ggtgggaggt |     |     |     |     |     |     |     |     |     |     | 1391 |
| Leu        |            |             |            |            |            |     |     |     |     |     |     |     |     |     |     |      |
| gggagtggt  | gcagggaccc | tagtgtctctg | gtctatctct | ccagcctcgg | cccacacgca |     |     |     |     |     |     |     |     |     |     | 1451 |
| agggagtcgg | gggacggccc | gctgctggcc  | gctctcttct | ctgcctctca | ccaggacagc |     |     |     |     |     |     |     |     |     |     | 1511 |
| cgccccccag | ggtactcctg | cccttgcttg  | actcagtttc | cctcctttga | aagggaagga |     |     |     |     |     |     |     |     |     |     | 1571 |
| gcaaaacggc | catttgggat | gccagggtgg  | atgaaaaggt | gaagaaatca | ggggattgag |     |     |     |     |     |     |     |     |     |     | 1631 |
| acttgggtgg | gtgggcatct | ctcaggagcc  | ccatctccgg | gcgtgtcacc | tcctgggcag |     |     |     |     |     |     |     |     |     |     | 1691 |
| ggttctggga | ccctctgtgg | gtgacgcaca  | ccctgggatg | gggctagtag | agccttcagg |     |     |     |     |     |     |     |     |     |     | 1751 |
| cgccttcggg | cgtggactct | ggcgactct   | agtggacagg | agaaggaacg | ccttccagga |     |     |     |     |     |     |     |     |     |     | 1811 |
| acctgtggac | taggggtgca | gggacttccc  | tttgcaaggg | gtaacagacc | gctggaaaac |     |     |     |     |     |     |     |     |     |     | 1871 |
| actgtcactt | tcagagctcg | gtggctcaca  | gcgtgtcctg | ccccggtttg | cggacgagag |     |     |     |     |     |     |     |     |     |     | 1931 |
| aaatcgcggc | ccacaagcat | cccccatccc  | ttgcaggctg | ggggctgggc | atgctgcadc |     |     |     |     |     |     |     |     |     |     | 1991 |
| ttaacctttt | gtattttatc | cctcaccttc  | tgcagggctc | cgtgcgggct | gaaattaaag |     |     |     |     |     |     |     |     |     |     | 2051 |
| atttcttag  |            |             |            |            |            |     |     |     |     |     |     |     |     |     |     | 2060 |

<210> 10  
 <211> 2679  
 <212> DNA  
 <213> Homo sapiens

<220>  
 <221> misc\_feature  
 <223> GENBANK Accession no. NM\_002073

```

<220>
<221> CDS
<222> (13)..(1077)

<400> 10
gagaccagga cc atg gga tgt cgg caa agc tca gag gaa aaa gaa gca gcc      51
      Met Gly Cys Arg Gln Ser Ser Glu Glu Lys Glu Ala Ala
            1                5                10

cgg cgg tcc cgg aga att gac cgc cac ctg cgc tca gag agc cag cgg      99
Arg Arg Ser Arg Arg Ile Asp Arg His Leu Arg Ser Glu Ser Gln Arg
      15                20                25

caa cgc cgc gaa atc aag ctg ctc ctg ctg ggc acc agc aac tca ggc      147
Gln Arg Arg Glu Ile Lys Leu Leu Leu Leu Gly Thr Ser Asn Ser Gly
      30                35                40                45

aag agc acc atc gtc aaa cag atg aag atc atc cac agc ggc ggc ttc      195
Lys Ser Thr Ile Val Lys Gln Met Lys Ile Ile His Ser Gly Gly Phe
            50                55                60

aac ctg gag gcc tgc aag gag tac aag ccc ctc atc atc tac aat gcc      243
Asn Leu Glu Ala Cys Lys Glu Tyr Lys Pro Leu Ile Ile Tyr Asn Ala
            65                70                75

atc gac tcg ctg acc cgc atc atc cgg gcc ctg gcc gcc ctc agg atc      291
Ile Asp Ser Leu Thr Arg Ile Ile Arg Ala Leu Ala Ala Leu Arg Ile
            80                85                90

gac ttc cac aac ccc gac cgc gcc tac gac gct gtg cag ctc ttt gcg      339
Asp Phe His Asn Pro Asp Arg Ala Tyr Asp Ala Val Gln Leu Phe Ala
            95                100                105

ctg acg ggc ccc gct gag agc aag ggc gag atc aca ccc gag ctg ctg      387
Leu Thr Gly Pro Ala Glu Ser Lys Gly Glu Ile Thr Pro Glu Leu Leu
      110                115                120                125

ggg gtc atg cga cgg ctc tgg gcc gac cca ggg gca cag gcc tgc ttc      435
Gly Val Met Arg Arg Leu Trp Ala Asp Pro Gly Ala Gln Ala Cys Phe
            130                135                140

agc cgc tcc agc gag tac cac ctg gag gac aac gcg gcc tac tac ctg      483
Ser Arg Ser Ser Glu Tyr His Leu Glu Asp Asn Ala Ala Tyr Tyr Leu
            145                150                155

aac gac ctg gag cgc atc gcc gca gct gac tat atc ccc act gtc gag      531
Asn Asp Leu Glu Arg Ile Ala Ala Ala Asp Tyr Ile Pro Thr Val Glu
            160                165                170

gac atc ctg cgc tcc cgg gac atg acc acg ggc att gtg gag aac aag      579
Asp Ile Leu Arg Ser Arg Asp Met Thr Thr Gly Ile Val Glu Asn Lys
            175                180                185

ttc acc ttc aag gag ctc acc ttc aag atg gtg gac gtg ggg ggg cag      627
Phe Thr Phe Lys Glu Leu Thr Phe Lys Met Val Asp Val Gly Gly Gln
      190                195                200                205

agg tca gag cgc aaa aag tgg atc cac tgc ttc gag ggc gtc aca gcc      675

```

|   |      |
|---|------|
| Arg Ser Glu Arg Lys Lys Trp Ile His Cys Phe Glu Gly Val Thr Ala     |      |
| 210 215 220   |      |
| atc atc ttc tgt gtg gag ctc agc ggc tac gac ctg aaa ctc tac gag     | 723  |
| Ile Ile Phe Cys Val Glu Leu Ser Gly Tyr Asp Leu Lys Leu Tyr Glu     |      |
| 225 230 235   |      |
| gat aac cag aca agt cgg atg gca gag agc ttg cgc ctc ttt gac tcc     | 771  |
| Asp Asn Gln Thr Ser Arg Met Ala Glu Ser Leu Arg Leu Phe Asp Ser     |      |
| 240 245 250   |      |
| atc tgc aac aac aac tgg ttc atc aac acc tca ctc atc ctc ttc ctg     | 819  |
| Ile Cys Asn Asn Asn Trp Phe Ile Asn Thr Ser Leu Ile Leu Phe Leu     |      |
| 255 260 265   |      |
| aac aag aag gac ctg ctg gca gag aag atc cgc cgc atc ccg ctc acc     | 867  |
| Asn Lys Lys Asp Leu Leu Ala Glu Lys Ile Arg Arg Ile Pro Leu Thr     |      |
| 270 275 280 285   |      |
| atc tgc ttt ccc gag tac aag ggc cag aac acg tac gag gag gcc gct     | 915  |
| Ile Cys Phe Pro Glu Tyr Lys Gly Gln Asn Thr Tyr Glu Glu Ala Ala     |      |
| 290 295 300   |      |
| gtc tac atc cag cgg cag ttt gaa gac ctg aac cgc aac aag gag acc     | 963  |
| Val Tyr Ile Gln Arg Gln Phe Glu Asp Leu Asn Arg Asn Lys Glu Thr     |      |
| 305 310 315   |      |
| aag gag atc tac tcc cac ttc acc tgc gcc acc gac acc agt aac atc     | 1011 |
| Lys Glu Ile Tyr Ser His Phe Thr Cys Ala Thr Asp Thr Ser Asn Ile     |      |
| 320 325 330   |      |
| cag ttt gtc ttc gac gcg gtg aca gac gtc atc ata cag aac aat ctc     | 1059 |
| Gln Phe Val Phe Asp Ala Val Thr Asp Val Ile Ile Gln Asn Asn Leu     |      |
| 335 340 345   |      |
| aag tac att ggc ctt tgc tgaggagctg ggccccggggc gcctgcctat           | 1107 |
| Lys Tyr Ile Gly Leu Cys   |      |
| 350 355   |      |
| ggtgaaaccc acgggggtgtc atgccccaac gcgtgctaga gaggcccaat ccaggggcag  | 1167 |
| aaaacagggg gcctaaagaa tgtccccac cccttggcct ctgcctcctt ggccccacat    | 1227 |
| ttctgcaaac ataaatatattt acggatagat tgctaggtag atagacacac acacatgcac | 1287 |
| acacacacat ctggagatgg caaaatcctc taaaatgtcg aggtctcttg aagacttgag   | 1347 |
| aagctgtcac aaggtcacta caagcccaac ctgccccctc actttgcctt cctgagttgg   | 1407 |
| ccccactcca cttgggggtc tgcattggat tgttagggat aggcagcagg gctgaggcaa   | 1467 |
| ggtaggccaa ctgcaccctt gtcacctgga ggagggccgg ctgctgccc gagctctggc    | 1527 |
| ctagggacct tgccgctgac caagaggag gaccagtga gggctctgtgc accttccttg    | 1587 |
| ctggcctgca cacagctgct cagcaccatt tcattctgga cctgggacct taggagccgg   | 1647 |
| gtgacagcac taaccagacc tccagccact cacagctctt tttaaaaaac agcttcaaaa   | 1707 |

|  |      |
|--|------|
| tatgcagcaa aaaccaatac aacaaaacga gtggcagcat ttatttcaaa ctaggccagc  | 1767 |
| tgggattcca gcttttcttc tactagtctg atgttttata aatcaaaacc tggttttcct  | 1827 |
| tctctggcat ttttttttgt tttttgtttt ttggtttttt tttttttttt ggccaaatct  | 1887 |
| cgtggtgttt cgcagaaaaa aatccagaaa atttcaaagc cagttgagta ttctttttta  | 1947 |
| aatgcagatt ttcaaaacat attttttttc aggtggtcct ttttgtgtct ggcttgctga  | 2007 |
| gtgtaaaagt tgttatctgg acgatctgtc tctctgtccc aaagaaattt tggagtgagt  | 2067 |
| ggcagtcctg cgccagcctc gcgggacacg tgttgtagat aagcctctgc agtgcctctc  | 2127 |
| tgtaaatggt ggggttttct gctttgtttt tatttaagaa aataaacacg acatatttaa  | 2187 |
| agaaggttct ttcacctggg agcaaatgaa caatagctaa gtgtcttggt atttaaagag  | 2247 |
| taaattatct gtggctttgc tgagtgaagg aaggggagca aggggtggtg cccctggtcc  | 2307 |
| cagcatgccc cgcgcctgag actggctgga aatgctctga ctctgtgaa ggcacagcca   | 2367 |
| gcgttggtggc ctgagggagg ccctgctggg accctgatct gggccttctc gtcccagggc | 2427 |
| ctatgggcaa ctgcgttgaa aggacgttcg ccaagggccg tgtgtaaata cgaactgcgc  | 2487 |
| catggagagg agaggcactg ccggagccct tgccagatct ccctccctct ctctgtgcag  | 2547 |
| tagctgtgtg tccgaggtca gtgtgcggaa tcacagccaa ggacgtgaag agatgtacgg  | 2607 |
| gggaaagaga agctggggat tggatgaaag tcaaagggtg tctactttaa gaaaataaaa  | 2667 |
| taccctgaat gg  | 2679 |

<210> 11  
 <211> 29  
 <212> DNA  
 <213> Artificial

<220>  
 <223> Synthetic

|                                 |    |
|---------------------------------|----|
| <400> 11                        |    |
| cgcaagcttg actgaggcca ccgcaccat | 29 |

<210> 12  
 <211> 29  
 <212> DNA  
 <213> Artificial

<220>  
 <223> Synthetic

|                                 |    |
|---------------------------------|----|
| <400> 12                        |    |
| ctccttgctt cggttgctgc cctcggggc | 29 |

<210> 13  
 <211> 30  
 <212> DNA  
 <213> Artificial  
  
 <220>  
 <223> Synthetic  
  
 <400> 13  
 ggccccgagg gcagcaaccg aaacaaggag 30

<210> 14  
 <211> 37  
 <212> DNA  
 <213> Artificial  
  
 <220>  
 <223> Synthetic  
  
 <400> 14  
 gcattacgat gcggccgcag ctcctcagca aaggcca 37

<210> 15  
 <211> 1122  
 <212> DNA  
 <213> Artificial  
  
 <220>  
 <223> Synthetic  
  
 <220>  
 <221> CDS  
 <222> (1)..(1122)  
  
 <300>  
 <301> SEJAL M. MODY, MAURICE K. C. HO, SUSHMA A. JOSHI, and YUNG H. WONG  
 <302> Incorporation of GalphaZ-Specific Sequence at the Carboxyl Terminus Increases the Promiscuity of Galpha16 toward Gi-Coupled Receptors  
 <303> The American Society for Pharmacology and Experimental Therapeutics  
 <304> 57  
 <306> 13-23  
 <307> 2000  
  
 <400> 15  
 atg gcc cgc tcg ctg acc tgg cgc tgc tgc ccc tgg tgc ctg acg gag 48  
 Met Ala Arg Ser Leu Thr Trp Arg Cys Cys Pro Trp Cys Leu Thr Glu  
 1 5 10 15  
  
 gat gag aag gcc gcc gcc cgg gtg gac cag gag atc aac agg atc ctc 96  
 Asp Glu Lys Ala Ala Ala Arg Val Asp Gln Glu Ile Asn Arg Ile Leu

| 20  |     |     |     |     |     | 25  |     |     |     |     |     | 30  |     |     |     |     |  |  |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
| ttg | gag | cag | aag | aag | cag | gac | cgc | ggg | gag | ctg | aag | ctg | ctg | ctt | ttg | 144 |  |  |
| Leu | Glu | Gln | Lys | Lys | Gln | Asp | Arg | Gly | Glu | Leu | Lys | Leu | Leu | Leu | Leu |     |  |  |
|     |     | 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |     |  |  |
| ggc | cca | ggc | gag | agc | ggg | aag | agc | acc | ttc | atc | aag | cag | atg | cgg | atc | 192 |  |  |
| Gly | Pro | Gly | Glu | Ser | Gly | Lys | Ser | Thr | Phe | Ile | Lys | Gln | Met | Arg | Ile |     |  |  |
|     | 50  |     |     |     |     | 55  |     |     |     |     | 60  |     |     |     |     |     |  |  |
| atc | cac | ggc | gcc | ggc | tac | tcg | gag | gag | gag | cgc | aag | ggc | ttc | cgg | ccc | 240 |  |  |
| Ile | His | Gly | Ala | Gly | Tyr | Ser | Glu | Glu | Glu | Arg | Lys | Gly | Phe | Arg | Pro |     |  |  |
| 65  |     |     |     |     | 70  |     |     |     |     | 75  |     |     |     |     | 80  |     |  |  |
| ctg | gtc | tac | cag | aac | atc | ttc | gtg | tcc | atg | cgg | gcc | atg | atc | gag | gcc | 288 |  |  |
| Leu | Val | Tyr | Gln | Asn | Ile | Phe | Val | Ser | Met | Arg | Ala | Met | Ile | Glu | Ala |     |  |  |
|     |     |     |     | 85  |     |     |     | 90  |     |     |     |     |     | 95  |     |     |  |  |
| atg | gag | cgg | ctg | cag | att | cca | ttc | agc | agg | ccc | gag | agc | aag | cac | cac | 336 |  |  |
| Met | Glu | Arg | Leu | Gln | Ile | Pro | Phe | Ser | Arg | Pro | Glu | Ser | Lys | His | His |     |  |  |
|     |     |     | 100 |     |     |     |     | 105 |     |     |     |     | 110 |     |     |     |  |  |
| gct | agc | ctg | gtc | atg | agc | cag | gac | ccc | tat | aaa | gtg | acc | acg | ttt | gag | 384 |  |  |
| Ala | Ser | Leu | Val | Met | Ser | Gln | Asp | Pro | Tyr | Lys | Val | Thr | Thr | Phe | Glu |     |  |  |
|     |     | 115 |     |     |     |     | 120 |     |     |     |     | 125 |     |     |     |     |  |  |
| aag | cgc | tac | gct | gcg | gcc | atg | cag | tgg | ctg | tgg | agg | gat | gcc | ggc | atc | 432 |  |  |
| Lys | Arg | Tyr | Ala | Ala | Ala | Met | Gln | Trp | Leu | Trp | Arg | Asp | Ala | Gly | Ile |     |  |  |
|     | 130 |     |     |     |     | 135 |     |     |     |     | 140 |     |     |     |     |     |  |  |
| cgg | gcc | tgc | tat | gag | cgt | cgg | cgg | gaa | ttc | cac | ctg | ctc | gat | tca | gcc | 480 |  |  |
| Arg | Ala | Cys | Tyr | Glu | Arg | Arg | Arg | Glu | Phe | His | Leu | Leu | Asp | Ser | Ala |     |  |  |
| 145 |     |     |     |     | 150 |     |     |     |     | 155 |     |     |     |     | 160 |     |  |  |
| gtg | tac | tac | ctg | tcc | cac | ctg | gag | cgc | atc | acc | gag | gag | ggc | tac | gtc | 528 |  |  |
| Val | Tyr | Tyr | Leu | Ser | His | Leu | Glu | Arg | Ile | Thr | Glu | Glu | Gly | Tyr | Val |     |  |  |
|     |     |     |     | 165 |     |     |     | 170 |     |     |     |     |     | 175 |     |     |  |  |
| ccc | aca | gct | cag | gac | gtg | ctc | cgc | agc | cgc | atg | ccc | acc | act | ggc | atc | 576 |  |  |
| Pro | Thr | Ala | Gln | Asp | Val | Leu | Arg | Ser | Arg | Met | Pro | Thr | Thr | Gly | Ile |     |  |  |
|     |     |     | 180 |     |     |     | 185 |     |     |     |     |     | 190 |     |     |     |  |  |
| aac | gag | tac | tgc | ttc | tcc | gtg | cag | aaa | acc | aac | ctg | cgg | atc | gtg | gac | 624 |  |  |
| Asn | Glu | Tyr | Cys | Phe | Ser | Val | Gln | Lys | Thr | Asn | Leu | Arg | Ile | Val | Asp |     |  |  |
|     |     | 195 |     |     |     |     | 200 |     |     |     |     | 205 |     |     |     |     |  |  |
| gtc | ggg | ggc | cag | aag | tca | gag | cgt | aag | aaa | tgg | atc | cat | tgt | ttc | gag | 672 |  |  |
| Val | Gly | Gly | Gln | Lys | Ser | Glu | Arg | Lys | Lys | Trp | Ile | His | Cys | Phe | Glu |     |  |  |
|     | 210 |     |     |     |     | 215 |     |     |     | 220 |     |     |     |     |     |     |  |  |
| aac | gtg | atc | gcc | ctc | atc | tac | ctg | gcc | tca | ctg | agt | gaa | tac | gac | cag | 720 |  |  |
| Asn | Val | Ile | Ala | Leu | Ile | Tyr | Leu | Ala | Ser | Leu | Ser | Glu | Tyr | Asp | Gln |     |  |  |
| 225 |     |     |     |     | 230 |     |     |     |     | 235 |     |     |     |     | 240 |     |  |  |
| tgc | ctg | gag | gag | aac | aac | cag | gag | aac | cgc | atg | aag | gag | agc | ctc | gca | 768 |  |  |
| Cys | Leu | Glu | Glu | Asn | Asn | Gln | Glu | Asn | Arg | Met | Lys | Glu | Ser | Leu | Ala |     |  |  |
|     |     |     |     | 245 |     |     |     | 250 |     |     |     |     |     | 255 |     |     |  |  |

|   |      |
|---|------|
| ttg ttt ggg act atc ctg gaa cta ccc tgg ttc aaa agc aca tcc gtc | 816  |
| Leu Phe Gly Thr Ile Leu Glu Leu Pro Trp Phe Lys Ser Thr Ser Val |      |
| 260 265 270   |      |
| atc ctc ttt ctc aac aaa acc gac atc ctg gag gag aaa atc ccc acc | 864  |
| Ile Leu Phe Leu Asn Lys Thr Asp Ile Leu Glu Glu Lys Ile Pro Thr |      |
| 275 280 285   |      |
| tcc cac ctg gct acc tat ttc ccc agt ttc cag ggc cct aag cag gat | 912  |
| Ser His Leu Ala Thr Tyr Phe Pro Ser Phe Gln Gly Pro Lys Gln Asp |      |
| 290 295 300   |      |
| gct gag gca gcc aag agg ttc atc ctg gac atg tac acg agg atg tac | 960  |
| Ala Glu Ala Ala Lys Arg Phe Ile Leu Asp Met Tyr Thr Arg Met Tyr |      |
| 305 310 315 320   |      |
| acc ggg tgc gtg gac ggc ccc gag ggc agc aac cgc aac aag gag acc | 1008 |
| Thr Gly Cys Val Asp Gly Pro Glu Gly Ser Asn Arg Asn Lys Glu Thr |      |
| 325 330 335   |      |
| aag gag atc tac tcc cac ttc acc tgc gcc acc gac acc agt aac atc | 1056 |
| Lys Glu Ile Tyr Ser His Phe Thr Cys Ala Thr Asp Thr Ser Asn Ile |      |
| 340 345 350   |      |
| cag ttt gtc ttc gac gcg gtg aca gac gtc atc ata cag aac aat ctc | 1104 |
| Gln Phe Val Phe Asp Ala Val Thr Asp Val Ile Ile Gln Asn Asn Leu |      |
| 355 360 365   |      |
| aag tac att ggc ctt tgc   | 1122 |
| Lys Tyr Ile Gly Leu Cys   |      |
| 370   |      |
|   |      |
| <210> 16  |      |
| <211> 2529  |      |
| <212> DNA   |      |
| <213> Mus musculus  |      |
|   |      |
| <220>   |      |
| <221> misc_feature  |      |
| <223> GENBANK Accession no. AY032622                            |      |
|   |      |
| <220>   |      |
| <221> CDS   |      |
| <222> (1)..(2526)   |      |
|   |      |
| <400> 16  |      |
| atg ctt ttc tgg gca gct cac ctg ctg ctc agc ctg cag ctg gcc gtt | 48   |
| Met Leu Phe Trp Ala Ala His Leu Leu Leu Ser Leu Gln Leu Ala Val |      |
| 1 5 10 15   |      |
| gct tac tgc tgg gct ttc agc tgc caa agg aca gaa tcc tct cca ggt | 96   |
| Ala Tyr Cys Trp Ala Phe Ser Cys Gln Arg Thr Glu Ser Ser Pro Gly |      |
| 20 25 30  |      |
| ttc agc ctc cct ggg gac ttc ctc ctg gca ggc ctg ttc tcc ctc cat | 144  |
| Phe Ser Leu Pro Gly Asp Phe Leu Leu Ala Gly Leu Phe Ser Leu His |      |

| 35  |     |     |     |     | 40  |     |     |     |     | 45  |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| gct | gac | tgt | ctg | cag | gtg | aga | cac | aga | cct | ctg | gtg | aca | agt | tgt | gac | 192 |
| Ala | Asp | Cys | Leu | Gln | Val | Arg | His | Arg | Pro | Leu | Val | Thr | Ser | Cys | Asp |     |
| 50  |     |     |     |     |     | 55  |     |     |     |     | 60  |     |     |     |     |     |
| agg | tct | gac | agc | ttc | aac | ggc | cat | ggc | tat | cac | ctc | ttc | caa | gcc | atg | 240 |
| Arg | Ser | Asp | Ser | Phe | Asn | Gly | His | Gly | Tyr | His | Leu | Phe | Gln | Ala | Met |     |
| 65  |     |     |     | 70  |     |     |     |     | 75  |     |     |     |     |     | 80  |     |
| cgg | ttc | acc | gtt | gag | gag | ata | aac | aac | tcc | aca | gct | ctg | ctt | ccc | aac | 288 |
| Arg | Phe | Thr | Val | Glu | Glu | Ile | Asn | Asn | Ser | Thr | Ala | Leu | Leu | Pro | Asn |     |
|     |     |     |     | 85  |     |     |     |     | 90  |     |     |     |     | 95  |     |     |
| atc | acc | ctg | ggg | tat | gaa | ctg | tat | gac | gtg | tgc | tca | gag | tct | tcc | aat | 336 |
| Ile | Thr | Leu | Gly | Tyr | Glu | Leu | Tyr | Asp | Val | Cys | Ser | Glu | Ser | Ser | Asn |     |
|     |     |     | 100 |     |     |     |     | 105 |     |     |     |     | 110 |     |     |     |
| gtc | tat | gcc | acc | ctg | agg | gtg | ccc | gcc | cag | caa | ggg | aca | ggc | cac | cta | 384 |
| Val | Tyr | Ala | Thr | Leu | Arg | Val | Pro | Ala | Gln | Gln | Gly | Thr | Gly | His | Leu |     |
|     |     |     | 115 |     |     |     | 120 |     |     |     |     | 125 |     |     |     |     |
| gag | atg | cag | aga | gat | ctt | cgc | aac | cac | tcc | tcc | aag | gtg | gtg | gca | ctc | 432 |
| Glu | Met | Gln | Arg | Asp | Leu | Arg | Asn | His | Ser | Ser | Lys | Val | Val | Ala | Leu |     |
|     | 130 |     |     |     |     | 135 |     |     |     |     | 140 |     |     |     |     |     |
| att | ggg | cct | gat | aac | act | gac | cac | gct | gtc | acc | act | gct | gcc | ctg | ctg | 480 |
| Ile | Gly | Pro | Asp | Asn | Thr | Asp | His | Ala | Val | Thr | Thr | Ala | Ala | Leu | Leu |     |
| 145 |     |     |     |     | 150 |     |     |     |     | 155 |     |     |     |     | 160 |     |
| agc | cct | ttt | ctg | atg | ccc | ctg | gtc | agc | tat | gag | gcg | agc | agc | gtg | atc | 528 |
| Ser | Pro | Phe | Leu | Met | Pro | Leu | Val | Ser | Tyr | Glu | Ala | Ser | Ser | Val | Ile |     |
|     |     |     |     | 165 |     |     |     |     | 170 |     |     |     |     | 175 |     |     |
| ctc | agt | ggg | aag | cgc | aag | ttc | ccg | tcc | ttc | ttg | cgc | acc | atc | ccc | agc | 576 |
| Leu | Ser | Gly | Lys | Arg | Lys | Phe | Pro | Ser | Phe | Leu | Arg | Thr | Ile | Pro | Ser |     |
|     |     |     | 180 |     |     |     |     | 185 |     |     |     |     | 190 |     |     |     |
| gat | aag | tac | cag | gtg | gaa | gtc | ata | gtg | cgg | ctg | ctg | cag | agc | ttc | ggc | 624 |
| Asp | Lys | Tyr | Gln | Val | Glu | Val | Ile | Val | Arg | Leu | Leu | Gln | Ser | Phe | Gly |     |
|     |     |     | 195 |     |     |     | 200 |     |     |     |     | 205 |     |     |     |     |
| tgg | gtc | tgg | atc | tcg | ctc | gtt | ggc | agc | tat | ggt | gac | tac | ggg | cag | ctg | 672 |
| Trp | Val | Trp | Ile | Ser | Leu | Val | Gly | Ser | Tyr | Gly | Asp | Tyr | Gly | Gln | Leu |     |
|     | 210 |     |     |     |     | 215 |     |     |     |     | 220 |     |     |     |     |     |
| ggc | gta | cag | gcg | ctg | gag | gag | ctg | gcc | act | cca | cgg | ggc | atc | tgc | gtc | 720 |
| Gly | Val | Gln | Ala | Leu | Glu | Glu | Leu | Ala | Thr | Pro | Arg | Gly | Ile | Cys | Val |     |
| 225 |     |     |     |     | 230 |     |     |     |     | 235 |     |     |     |     | 240 |     |
| gcc | ttc | aag | gac | gtg | gtg | cct | ctc | tcc | gcc | cag | gcg | ggt | gac | cca | agg | 768 |
| Ala | Phe | Lys | Asp | Val | Val | Pro | Leu | Ser | Ala | Gln | Ala | Gly | Asp | Pro | Arg |     |
|     |     |     |     | 245 |     |     |     |     | 250 |     |     |     |     | 255 |     |     |
| atg | cag | cgc | atg | atg | ctg | cgt | ctg | gct | cga | gcc | agg | acc | acc | gtg | gtc | 816 |
| Met | Gln | Arg | Met | Met | Leu | Arg | Leu | Ala | Arg | Ala | Arg | Thr | Thr | Val | Val |     |
|     |     |     | 260 |     |     |     |     | 265 |     |     |     |     | 270 |     |     |     |



|   |      |
|---|------|
| gtg gtc ttc tct aac cgg cac ctg gct gga gtg ttc ttc agg tct gtg<br>Val Val Phe Ser Asn Arg His Leu Ala Gly Val Phe Phe Arg Ser Val<br>275 280 285     | 864  |
| gtg ctg gcc aac ctg act ggc aaa gtg tgg atc gcc tcc gaa gac tgg<br>Val Leu Ala Asn Leu Thr Gly Lys Val Trp Ile Ala Ser Glu Asp Trp<br>290 295 300     | 912  |
| gcc atc tcc acg tac atc acc aat gtg ccc ggg atc cag ggc att ggg<br>Ala Ile Ser Thr Tyr Ile Thr Asn Val Pro Gly Ile Gln Gly Ile Gly<br>305 310 315 320 | 960  |
| acg gtg ctg ggg gtg gcc atc cag cag aga caa gtc cct ggc ctg aag<br>Thr Val Leu Gly Val Ala Ile Gln Gln Arg Gln Val Pro Gly Leu Lys<br>325 330 335     | 1008 |
| gag ttt gaa gag tcc tat gtc cag gca gtg atg ggt gct ccc aga act<br>Glu Phe Glu Glu Ser Tyr Val Gln Ala Val Met Gly Ala Pro Arg Thr<br>340 345 350     | 1056 |
| tgc cca gag ggg tcc tgg tgc ggc act aac cag ctg tgc agg gag tgt<br>Cys Pro Glu Gly Ser Trp Cys Gly Thr Asn Gln Leu Cys Arg Glu Cys<br>355 360 365     | 1104 |
| cac gct ttc acg aca tgg aac atg ccc gag ctt gga gcc ttc tcc atg<br>His Ala Phe Thr Thr Trp Asn Met Pro Glu Leu Gly Ala Phe Ser Met<br>370 375 380     | 1152 |
| agc gct gcc tac aat gtg tat gag gct gtg tat gct gtg gcc cac ggc<br>Ser Ala Ala Tyr Asn Val Tyr Glu Ala Val Tyr Ala Val Ala His Gly<br>385 390 395 400 | 1200 |
| ctc cac cag ctc ctg gga tgt acc tct ggg acc tgt gcc aga ggc cca<br>Leu His Gln Leu Leu Gly Cys Thr Ser Gly Thr Cys Ala Arg Gly Pro<br>405 410 415     | 1248 |
| gtc tac ccc tgg cag ctt ctt cag cag atc tac aag gtg aat ttc ctt<br>Val Tyr Pro Trp Gln Leu Leu Gln Gln Ile Tyr Lys Val Asn Phe Leu<br>420 425 430     | 1296 |
| cta cat aag aag act gta gca ttc gat gac aag ggg gac cct cta ggt<br>Leu His Lys Lys Thr Val Ala Phe Asp Asp Lys Gly Asp Pro Leu Gly<br>435 440 445     | 1344 |
| tat tat gac atc atc gcc tgg gac tgg aat gga cct gaa tgg acc ttt<br>Tyr Tyr Asp Ile Ile Ala Trp Asp Trp Asn Gly Pro Glu Trp Thr Phe<br>450 455 460     | 1392 |
| gag gtc att ggt tct gcc tca ctg tct cca gtt cat cta gac ata aat<br>Glu Val Ile Gly Ser Ala Ser Leu Ser Pro Val His Leu Asp Ile Asn<br>465 470 475 480 | 1440 |
| aag aca aaa atc cag tgg cac ggg aag aac aat cag gtg cct gtg tca<br>Lys Thr Lys Ile Gln Trp His Gly Lys Asn Asn Gln Val Pro Val Ser<br>485 490 495     | 1488 |
| gtg tgt acc agg gac tgt ctc gaa ggg cac cac agg ttg gtc atg ggt<br>Val Cys Thr Arg Asp Cys Leu Glu Gly His His Arg Leu Val Met Gly                    | 1536 |

| 500 |     |     |     |     |     |     | 505 |     |     |     |     | 510 |     |     |     |      |  |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|--|
| tcc | cac | cac | tgc | tgc | ttc | gag | tgc | atg | ccc | tgt | gaa | gct | ggg | aca | ttt | 1584 |  |
| Ser | His | His | Cys | Cys | Phe | Glu | Cys | Met | Pro | Cys | Glu | Ala | Gly | Thr | Phe |      |  |
|     |     | 515 |     |     |     |     |     | 520 |     |     |     |     | 525 |     |     |      |  |
| ctc | aac | acg | agt | gag | ctt | cac | acc | tgc | cag | cct | tgt | gga | aca | gaa | gaa | 1632 |  |
| Leu | Asn | Thr | Ser | Glu | Leu | His | Thr | Cys | Gln | Pro | Cys | Gly | Thr | Glu | Glu |      |  |
|     |     | 530 |     |     |     |     | 535 |     |     |     |     | 540 |     |     |     |      |  |
| tgg | gcc | cct | gag | ggg | agc | tca | gcc | tgc | ttc | tca | cgc | acc | gtg | gag | ttc | 1680 |  |
| Trp | Ala | Pro | Glu | Gly | Ser | Ala | Cys | Phe | Ser | Arg | Thr | Val | Glu | Phe |     |      |  |
|     |     |     |     |     | 550 |     |     |     |     | 555 |     |     |     |     | 560 |      |  |
| ttg | ggg | tgg | cat | gaa | ccc | atc | tct | ttg | gtg | cta | tta | gca | gct | aac | acg | 1728 |  |
| Leu | Gly | Trp | His | Glu | Pro | Ile | Ser | Leu | Val | Leu | Leu | Ala | Ala | Asn | Thr |      |  |
|     |     |     |     | 565 |     |     |     |     | 570 |     |     |     |     | 575 |     |      |  |
| cta | ttg | ctg | ctg | ctg | ctg | att | ggg | act | gct | ggc | ctg | ttt | gcc | tgg | cgt | 1776 |  |
| Leu | Leu | Leu | Leu | Leu | Leu | Ile | Gly | Thr | Ala | Gly | Leu | Phe | Ala | Trp | Arg |      |  |
|     |     |     |     | 580 |     |     |     | 585 |     |     |     |     | 590 |     |     |      |  |
| ctt | cac | acg | cct | gtt | gtg | agg | tca | gct | ggg | ggt | agg | ctg | tgc | ttc | ctc | 1824 |  |
| Leu | His | Thr | Pro | Val | Val | Arg | Ser | Ala | Gly | Gly | Arg | Leu | Cys | Phe | Leu |      |  |
|     |     | 595 |     |     |     |     | 600 |     |     |     |     | 605 |     |     |     |      |  |
| atg | ctg | ggg | tcc | ttg | gta | gct | ggg | agt | tgc | agc | ctc | tac | agc | ttc | ttc | 1872 |  |
| Met | Leu | Gly | Ser | Leu | Val | Ala | Gly | Ser | Cys | Ser | Leu | Tyr | Ser | Phe | Phe |      |  |
|     |     | 610 |     |     |     | 615 |     |     |     |     | 620 |     |     |     |     |      |  |
| ggg | aag | ccc | acg | gtg | ccc | gcg | tgc | ttg | ctg | cgt | cag | ccc | ctc | ttt | tct | 1920 |  |
| Gly | Lys | Pro | Thr | Val | Pro | Ala | Cys | Leu | Leu | Arg | Gln | Pro | Leu | Phe | Ser |      |  |
|     |     | 625 |     |     |     | 630 |     |     |     | 635 |     |     |     |     | 640 |      |  |
| ctc | ggg | ttt | gcc | att | ttc | ctc | tcc | tgt | ctg | aca | atc | cgc | tcc | ttc | caa | 1968 |  |
| Leu | Gly | Phe | Ala | Ile | Phe | Leu | Ser | Cys | Leu | Thr | Ile | Arg | Ser | Phe | Gln |      |  |
|     |     |     |     | 645 |     |     |     |     | 650 |     |     |     |     | 655 |     |      |  |
| ctg | gtc | atc | atc | ttc | aag | ttt | tct | acc | aag | gta | ccc | aca | ttc | tac | cac | 2016 |  |
| Leu | Val | Ile | Ile | Phe | Lys | Phe | Ser | Thr | Lys | Val | Pro | Thr | Phe | Tyr | His |      |  |
|     |     |     |     | 660 |     |     |     | 665 |     |     |     |     | 670 |     |     |      |  |
| act | tgg | gcc | caa | aac | cat | ggg | gcc | gga | ata | ttc | gtc | att | gtc | agc | tcc | 2064 |  |
| Thr | Trp | Ala | Gln | Asn | His | Gly | Ala | Gly | Ile | Phe | Val | Ile | Val | Ser | Ser |      |  |
|     |     | 675 |     |     |     |     | 680 |     |     |     |     | 685 |     |     |     |      |  |
| acg | gtc | cat | ttg | ttc | ctc | tgt | ctc | acg | tgg | ctt | gca | atg | tgg | acc | cca | 2112 |  |
| Thr | Val | His | Leu | Phe | Leu | Cys | Leu | Thr | Trp | Leu | Ala | Met | Trp | Thr | Pro |      |  |
|     |     | 690 |     |     |     | 695 |     |     |     |     | 700 |     |     |     |     |      |  |
| cgg | ccc | acc | agg | gag | tac | cag | cgc | ttc | ccc | cat | ctg | gtg | att | ctt | gag | 2160 |  |
| Arg | Pro | Thr | Arg | Glu | Tyr | Gln | Arg | Phe | Pro | His | Leu | Val | Ile | Leu | Glu |      |  |
|     |     |     |     |     | 710 |     |     |     |     | 715 |     |     |     |     | 720 |      |  |
| tgc | aca | gag | gtc | aac | tct | gtg | ggc | ttc | ctg | gtg | gct | ttc | gca | cac | aac | 2208 |  |
| Cys | Thr | Glu | Val | Asn | Ser | Val | Gly | Phe | Leu | Val | Ala | Phe | Ala | His | Asn |      |  |
|     |     |     |     | 725 |     |     |     |     | 730 |     |     |     |     | 735 |     |      |  |

|   |      |
|---|------|
| atc ctc ctc tcc atc agc acc ttt gtc tgc agc tac ctg ggt aag gaa | 2256 |
| Ile Leu Leu Ser Ile Ser Thr Phe Val Cys Ser Tyr Leu Gly Lys Glu |      |
| 740 745 750   |      |

|   |      |
|---|------|
| ctg ccg gag aac tat aac gaa gcc aaa tgt gtc acc ttc agc ctg ctc | 2304 |
| Leu Pro Glu Asn Tyr Asn Glu Ala Lys Cys Val Thr Phe Ser Leu Leu |      |
| 755 760 765   |      |

|   |      |
|---|------|
| ctc cac ttc gta tcc tgg atc gct ttc ttc acc atg tcc agc att tac | 2352 |
| Leu His Phe Val Ser Trp Ile Ala Phe Phe Thr Met Ser Ser Ile Tyr |      |
| 770 775 780   |      |

|   |      |
|---|------|
| cag ggc agc tac cta ccc gcg gtc aat gtg ctg gca ggg ctg gcc act | 2400 |
| Gln Gly Ser Tyr Leu Pro Ala Val Asn Val Leu Ala Gly Leu Ala Thr |      |
| 785 790 795 800   |      |

|   |      |
|---|------|
| ctg agt ggc ggc ttc agc ggc tat ttc ctc cct aaa tgc tac gtg att | 2448 |
| Leu Ser Gly Gly Phe Ser Gly Tyr Phe Leu Pro Lys Cys Tyr Val Ile |      |
| 805 810 815   |      |

|   |      |
|---|------|
| ctc tgc cgt cca gaa ctc aac aac aca gaa cac ttt cag gcc tcc atc | 2496 |
| Leu Cys Arg Pro Glu Leu Asn Asn Thr Glu His Phe Gln Ala Ser Ile |      |
| 820 825 830   |      |

|   |      |
|---|------|
| cag gac tac acg agg cgc tgc ggc act acc tga | 2529 |
| Gln Asp Tyr Thr Arg Arg Cys Gly Thr Thr     |      |
| 835 840                                     |      |

<210> 17  
 <211> 2532  
 <212> DNA /  
 <213> Mus musculus

<220>  
 <221> misc\_feature  
 <223> GENBANK Accession No. AY032623

<220>  
 <221> CDS  
 <222> (1)..(2529)

|   |    |
|---|----|
| <400> 17  |    |
| atg gga ccc cag gcg agg aca ctc cat ttg ctg ttt ctc ctg ctg cat | 48 |
| Met Gly Pro Gln Ala Arg Thr Leu His Leu Leu Phe Leu Leu His     |    |
| 1 5 10 15   |    |

|   |    |
|---|----|
| gct ctg cct aag cca gtc atg ctg gta ggg aac tcc gac ttt cac ctg | 96 |
| Ala Leu Pro Lys Pro Val Met Leu Val Gly Asn Ser Asp Phe His Leu |    |
| 20 25 30  |    |

|   |     |
|---|-----|
| gct ggg gac tac ctc ctg ggt ggc ctc ttt acc ctc cat gcc aac gtg | 144 |
| Ala Gly Asp Tyr Leu Leu Gly Gly Leu Phe Thr Leu His Ala Asn Val |     |
| 35 40 45  |     |

|   |     |
|---|-----|
| aag agt gtc tct cac ctc agc tac ctg cag gtg ccc aag tgc aat gag | 192 |
| Lys Ser Val Ser His Leu Ser Tyr Leu Gln Val Pro Lys Cys Asn Glu |     |

| 50  | 55  | 60  |     |
|---|-----|-----|-----|
| tac aac atg aag gtg ttg ggc tac aac ctc atg cag gcc atg cga ttc |     |     | 240 |
| Tyr Asn Met Lys Val Leu Gly Tyr Asn Leu Met Gln Ala Met Arg Phe |     |     |     |
| 65  | 70  | 75  | 80  |
| gcc gtg gag gaa atc aac aac tgt agc tct ttg ctg ccc ggc gtg ctg |     |     | 288 |
| Ala Val Glu Glu Ile Asn Asn Cys Ser Ser Leu Leu Pro Gly Val Leu |     |     |     |
|   | 85  | 90  | 95  |
| ctc ggc tac gag atg gtg gat gtc tgc tac ctc tcc aac aat atc cag |     |     | 336 |
| Leu Gly Tyr Glu Met Val Asp Val Cys Tyr Leu Ser Asn Asn Ile Gln |     |     |     |
|   | 100 | 105 | 110 |
| cct ggg ctc tac ttc ctg tca cag ata gat gac ttc ctg ccc atc ctc |     |     | 384 |
| Pro Gly Leu Tyr Phe Leu Ser Gln Ile Asp Asp Phe Leu Pro Ile Leu |     |     |     |
|   | 115 | 120 | 125 |
| aaa gac tac agc cag tac agg ccc caa gtg gtg gct gtt att ggc cca |     |     | 432 |
| Lys Asp Tyr Ser Gln Tyr Arg Pro Gln Val Val Ala Val Ile Gly Pro |     |     |     |
|   | 130 | 135 | 140 |
| gac aac tct gag tct gcc atc acc gtg tcc aac att ctc tcc tac ttc |     |     | 480 |
| Asp Asn Ser Glu Ser Ala Ile Thr Val Ser Asn Ile Leu Ser Tyr Phe |     |     |     |
|   | 145 | 150 | 155 |
| ctc gtg cca cag gtc aca tat agc gcc atc acc gac aag ctg caa gac |     |     | 528 |
| Leu Val Pro Gln Val Thr Tyr Ser Ala Ile Thr Asp Lys Leu Gln Asp |     |     |     |
|   | 165 | 170 | 175 |
| aag cgg cgc ttc cct gcc atg ctg cgc act gtg ccc agc gcc acc cac |     |     | 576 |
| Lys Arg Arg Phe Pro Ala Met Leu Arg Thr Val Pro Ser Ala Thr His |     |     |     |
|   | 180 | 185 | 190 |
| cac atc gag gcc atg gtg caa ctg atg gtt cac ttc cag tgg aac tgg |     |     | 624 |
| His Ile Glu Ala Met Val Gln Leu Met Val His Phe Gln Trp Asn Trp |     |     |     |
|   | 195 | 200 | 205 |
| atc gtg gtg ctg gtg agc gat gac gat tat ggc cga gag aac agc cac |     |     | 672 |
| Ile Val Val Leu Val Ser Asp Asp Asp Tyr Gly Arg Glu Asn Ser His |     |     |     |
|   | 210 | 215 | 220 |
| ctg ctg agc cag cgt ctg acc aac act ggc gac atc tgc att gcc ttc |     |     | 720 |
| Leu Leu Ser Gln Arg Leu Thr Asn Thr Gly Asp Ile Cys Ile Ala Phe |     |     |     |
|   | 225 | 230 | 235 |
| cag gag gtt ctg ccc gta cca gaa ccc aac cag gct gtg agg cct gag |     |     | 768 |
| Gln Glu Val Leu Pro Val Pro Glu Pro Asn Gln Ala Val Arg Pro Glu |     |     |     |
|   | 245 | 250 | 255 |
| gag cag gac caa ctg gac aac atc ctg gac aag ctg cgg cgg act tcg |     |     | 816 |
| Glu Gln Asp Gln Leu Asp Asn Ile Leu Asp Lys Leu Arg Arg Thr Ser |     |     |     |
|   | 260 | 265 | 270 |
| gcg cgt gtg gtg gtg ata ttc tcg ccg gag ctg agc ctg cac aac ttc |     |     | 864 |
| Ala Arg Val Val Val Ile Phe Ser Pro Glu Leu Ser Leu His Asn Phe |     |     |     |
|   | 275 | 280 | 285 |

|   |      |
|---|------|
| ttc cgt gag gtg ctg cgc tgg aac ttc acg ggc ttt gtg tgg att gcc | 912  |
| Phe Arg Glu Val Leu Arg Trp Asn Phe Thr Gly Phe Val Trp Ile Ala |      |
| 290 295 300   |      |
| tct gag tcc tgg gcc atc gac cct gtt cta cac aac ctc aca gag ctg | 960  |
| Ser Glu Ser Trp Ala Ile Asp Pro Val Leu His Asn Leu Thr Glu Leu |      |
| 305 310 315 320   |      |
| cgc cac acg ggc act ttc ctg ggt gtc acc atc cag agg gtg tcc atc | 1008 |
| Arg His Thr Gly Thr Phe Leu Gly Val Thr Ile Gln Arg Val Ser Ile |      |
| 325 330 335   |      |
| cct ggc ttc agc cag ttc cga gtg cgc cat gac aag cca ggg tat cgc | 1056 |
| Pro Gly Phe Ser Gln Phe Arg Val Arg His Asp Lys Pro Gly Tyr Arg |      |
| 340 345 350   |      |
| atg cct aac gag acc agc ctg cgg act acc tgt aac cag gac tgc gac | 1104 |
| Met Pro Asn Glu Thr Ser Leu Arg Thr Thr Cys Asn Gln Asp Cys Asp |      |
| 355 360 365   |      |
| gcc tgc atg aac atc act gag tcc ttc aac aac gtt ctc atg ctt tcg | 1152 |
| Ala Cys Met Asn Ile Thr Glu Ser Phe Asn Asn Val Leu Met Leu Ser |      |
| 370 375 380   |      |
| ggg gag cgt gtg gtc tac agc gtg tac tcg gcc gtc tac gcg gtg gcc | 1200 |
| Gly Glu Arg Val Val Tyr Ser Val Tyr Ser Ala Val Tyr Ala Val Ala |      |
| 385 390 395 400   |      |
| cac acc ctc cac aga ctc ctc cac tgc aat cag gtc cgc tgc acc aag | 1248 |
| His Thr Leu His Arg Leu Leu His Cys Asn Gln Val Arg Cys Thr Lys |      |
| 405 410 415   |      |
| caa atc gtc tat cca tgg cag cta ctc agg gag atc tgg cat gtc aac | 1296 |
| Gln Ile Val Tyr Pro Trp Gln Leu Leu Arg Glu Ile Trp His Val Asn |      |
| 420 425 430   |      |
| ttc acg ctc ctg ggc aac cag ctc ttc ttc gac gaa caa ggg gac atg | 1344 |
| Phe Thr Leu Leu Gly Asn Gln Leu Phe Phe Asp Glu Gln Gly Asp Met |      |
| 435 440 445   |      |
| ccg atg ctc ctg gac atc atc cag tgg cag tgg ggc ctg agc cag aac | 1392 |
| Pro Met Leu Leu Asp Ile Ile Gln Trp Gln Trp Gly Leu Ser Gln Asn |      |
| 450 455 460   |      |
| ccc ttc caa agc atc gcc tcc tac tcc ccc acc gag acg agg ctg acc | 1440 |
| Pro Phe Gln Ser Ile Ala Ser Tyr Ser Pro Thr Glu Thr Arg Leu Thr |      |
| 465 470 475 480   |      |
| tac att agc aat gtg tcc tgg tac acc ccc aac aac acg gtc ccc ata | 1488 |
| Tyr Ile Ser Asn Val Ser Trp Tyr Thr Pro Asn Asn Thr Val Pro Ile |      |
| 485 490 495   |      |
| tcc atg tgt tct aag agt tgc cag cct ggg caa atg aaa aaa ccc ata | 1536 |
| Ser Met Cys Ser Lys Ser Cys Gln Pro Gly Gln Met Lys Lys Pro Ile |      |
| 500 505 510   |      |
| ggc ctc cac cca tgc tgc ttc gag tgt gtg gac tgt ccg ccg gac acc | 1584 |
| Gly Leu His Pro Cys Cys Phe Glu Cys Val Asp Cys Pro Pro Asp Thr |      |

| 515   | 520                                 | 525 |      |
|---|-------------------------------------|-----|------|
| tac ctc aac cga tca gta gat                                     | gag ttt aac tgt ctg tcc tgc ccg ggt |     | 1632 |
| Tyr Leu Asn Arg Ser Val Asp                                     | Glu Phe Asn Cys Leu Ser Cys Pro Gly |     |      |
| 530   | 535                                 | 540 |      |
| tcc atg tgg tct tac aag aac aac atc gct tgc ttc aag cgg cgg ctg |                                     |     | 1680 |
| Ser Met Trp Ser Tyr Lys Asn Asn Ile Ala Cys Phe Lys Arg Arg Leu |                                     |     |      |
| 545   | 550                                 | 555 | 560  |
| gcc ttc ctg gag tgg cac gaa gtg ccc act atc gtg gtg acc atc ctg |                                     |     | 1728 |
| Ala Phe Leu Glu Trp His Glu Val Pro Thr Ile Val Val Thr Ile Leu |                                     |     |      |
|   | 565                                 | 570 | 575  |
| gcc gcc ctg ggc ttc atc agt acg ctg gcc att ctg ctc atc ttc tgg |                                     |     | 1776 |
| Ala Ala Leu Gly Phe Ile Ser Thr Leu Ala Ile Leu Leu Ile Phe Trp |                                     |     |      |
|   | 580                                 | 585 | 590  |
| aga cat ttc cag acg ccc atg gtg cgc tgc gcg ggc ggc ccc atg tgc |                                     |     | 1824 |
| Arg His Phe Gln Thr Pro Met Val Arg Ser Ala Gly Gly Pro Met Cys |                                     |     |      |
|   | 595                                 | 600 | 605  |
| ttc ctg atg ctg gtg ccc ctg ctg ctg gcg ttc ggg atg gtc ccc gtg |                                     |     | 1872 |
| Phe Leu Met Leu Val Pro Leu Leu Leu Ala Phe Gly Met Val Pro Val |                                     |     |      |
|   | 610                                 | 615 | 620  |
| tat gtg ggc ccc ccc acg gtc ttc tcc tgt ttc tgc cgc cag gct ttc |                                     |     | 1920 |
| Tyr Val Gly Pro Pro Thr Val Phe Ser Cys Phe Cys Arg Gln Ala Phe |                                     |     |      |
|   | 625                                 | 630 | 635  |
| ttc acc gtt tgc ttc tcc gtc tgc ctc tcc tgc atc acg gtg cgc tcc |                                     |     | 1968 |
| Phe Thr Val Cys Phe Ser Val Cys Leu Ser Cys Ile Thr Val Arg Ser |                                     |     |      |
|   | 645                                 | 650 | 655  |
| ttc cag att gtg tgc gtc ttc aag atg gcc aga cgc ctg cca agc gcc |                                     |     | 2016 |
| Phe Gln Ile Val Cys Val Phe Lys Met Ala Arg Arg Leu Pro Ser Ala |                                     |     |      |
|   | 660                                 | 665 | 670  |
| tac ggt ttc tgg atg cgt tac cac ggg ccc tac gtc ttc gtg gcc ttc |                                     |     | 2064 |
| Tyr Gly Phe Trp Met Arg Tyr His Gly Pro Tyr Val Phe Val Ala Phe |                                     |     |      |
|   | 675                                 | 680 | 685  |
| atc acg gcc gtc aag gtg gcc ctg gtg gcg ggc aac atg ctg gcc acc |                                     |     | 2112 |
| Ile Thr Ala Val Lys Val Ala Leu Val Ala Gly Asn Met Leu Ala Thr |                                     |     |      |
|   | 690                                 | 695 | 700  |
| acc atc aac ccc att ggc cgg acc gac ccc gat gac ccc aat atc ata |                                     |     | 2160 |
| Thr Ile Asn Pro Ile Gly Arg Thr Asp Pro Asp Asp Pro Asn Ile Ile |                                     |     |      |
|   | 705                                 | 710 | 715  |
| atc ctc tcc tgc cac cct aac tac cgc aac ggg cta ctc ttc aac acc |                                     |     | 2208 |
| Ile Leu Ser Cys His Pro Asn Tyr Arg Asn Gly Leu Leu Phe Asn Thr |                                     |     |      |
|   | 725                                 | 730 | 735  |
| agc atg gac ttg ctg ctg tcc gtg ctg ggt ttc agc ttc gcg tac gtg |                                     |     | 2256 |
| Ser Met Asp Leu Leu Leu Ser Val Leu Gly Phe Ser Phe Ala Tyr Val |                                     |     |      |
|   | 740                                 | 745 | 750  |

|   |      |
|---|------|
| ggc aag gaa ctg ccc acc aac tac aac gaa gcc aag ttc atc acc ctc | 2304 |
| Gly Lys Glu Leu Pro Thr Asn Tyr Asn Glu Ala Lys Phe Ile Thr Leu |      |
| 755 760 765   |      |
| agc atg acc ttc tcc ttc acc tcc tcc atc tcc ctc tgc acg ttc atg | 2352 |
| Ser Met Thr Phe Ser Phe Thr Ser Ser Ile Ser Leu Cys Thr Phe Met |      |
| 770 775 780   |      |
| tct gtc cac gat ggc gtg ctg gtc acc atc atg gat ctc ctg gtc act | 2400 |
| Ser Val His Asp Gly Val Leu Val Thr Ile Met Asp Leu Leu Val Thr |      |
| 785 790 795 800   |      |
| gtg ctc aac ttt ctg gcc atc ggc ttg ggg tac ttt ggc ccc aaa tgt | 2448 |
| Val Leu Asn Phe Leu Ala Ile Gly Leu Gly Tyr Phe Gly Pro Lys Cys |      |
| 805 810 815   |      |
| tac atg atc ctt ttc tac ccg gag cgc aac act tca gct tat ttc aat | 2496 |
| Tyr Met Ile Leu Phe Tyr Pro Glu Arg Asn Thr Ser Ala Tyr Phe Asn |      |
| 820 825 830   |      |
| agc atg att cag ggc tac acg atg agg aag agc tag                 | 2532 |
| Ser Met Ile Gln Gly Tyr Thr Met Arg Lys Ser                     |      |
| 835 840   |      |
| <210> 18  |      |
| <211> 2577  |      |
| <212> DNA   |      |
| <213> Mus musculus  |      |
| <220>   |      |
| <221> CDS   |      |
| <222> (1)..(2574)   |      |
| <400> 18  |      |
| atg cca gct ttg gct atc atg ggt ctc agc ctg gct gct ttc ctg gag | 48   |
| Met Pro Ala Leu Ala Ile Met Gly Leu Ser Leu Ala Ala Phe Leu Glu |      |
| 1 5 10 15   |      |
| ctt ggg atg ggg gcc tct ttg tgt ctg tca cag caa ttc aag gca caa | 96   |
| Leu Gly Met Gly Ala Ser Leu Cys Leu Ser Gln Gln Phe Lys Ala Gln |      |
| 20 25 30  |      |
| ggg gac tac ata ctg ggc ggg cta ttt ccc ctg ggc tca acc gag gag | 144  |
| Gly Asp Tyr Ile Leu Gly Gly Leu Phe Pro Leu Gly Ser Thr Glu Glu |      |
| 35 40 45  |      |
| gcc act ctc aac cag aga aca caa ccc aac agc atc ccg tgc aac agg | 192  |
| Ala Thr Leu Asn Gln Arg Thr Gln Pro Asn Ser Ile Pro Cys Asn Arg |      |
| 50 55 60  |      |
| ttc tca ccc ctt ggt ttg ttc ctg gcc atg gct atg aag atg gct gtg | 240  |
| Phe Ser Pro Leu Gly Leu Phe Leu Ala Met Ala Met Lys Met Ala Val |      |
| 65 70 75 80   |      |
| gag gag atc aac aat gga tct gcc ttg ctc cct ggg ctg cgg ctg ggc | 288  |
| Glu Glu Ile Asn Asn Gly Ser Ala Leu Leu Pro Gly Leu Arg Leu Gly |      |

| 85  |     |     |     |     |     |     |     |     |     | 90  |     |     |     |     | 95  |     |  |  |  |  |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|--|--|
| tat | gac | cta | ttt | gac | aca | tgc | tcc | gag | cca | gtg | gtc | acc | atg | aaa | tcc | 336 |  |  |  |  |
| Tyr | Asp | Leu | Phe | Asp | Thr | Cys | Ser | Glu | Pro | Val | Val | Thr | Met | Lys | Ser |     |  |  |  |  |
|     |     | 100 |     |     |     |     |     | 105 |     |     |     |     | 110 |     |     |     |  |  |  |  |
| agt | ctc | atg | ttc | ctg | gcc | aag | gtg | ggc | agt | caa | agc | att | gct | gcc | tac | 384 |  |  |  |  |
| Ser | Leu | Met | Phe | Leu | Ala | Lys | Val | Gly | Ser | Gln | Ser | Ile | Ala | Ala | Tyr |     |  |  |  |  |
|     |     | 115 |     |     |     |     | 120 |     |     |     |     | 125 |     |     |     |     |  |  |  |  |
| tgc | aac | tac | aca | cag | tac | caa | ccc | cgt | gtg | ctg | gct | gtc | atc | ggc | ccc | 432 |  |  |  |  |
| Cys | Asn | Tyr | Thr | Gln | Tyr |     | Pro | Arg | Val | Leu | Ala | Val | Ile | Gly | Pro |     |  |  |  |  |
|     | 130 |     |     |     |     | 135 |     |     |     |     | 140 |     |     |     |     |     |  |  |  |  |
| cac | tca | tca | gag | ctt | gcc | ctc | att | aca | ggc | aag | ttc | ttc | agc | ttc | ttc | 480 |  |  |  |  |
| His | Ser | Ser | Glu | Leu | Ala | Leu | Ile | Thr | Gly | Lys | Phe | Phe | Ser | Phe | Phe |     |  |  |  |  |
|     | 145 |     |     |     | 150 |     |     |     |     | 155 |     |     |     |     | 160 |     |  |  |  |  |
| ctc | atg | cca | cag | gtc | agc | tat | agt | gcc | agc | atg | gat | cgg | cta | agt | gac | 528 |  |  |  |  |
| Leu | Met | Pro | Gln | Val | Ser | Tyr | Ser | Ala | Ser | Met | Asp | Arg | Leu | Ser | Asp |     |  |  |  |  |
|     |     |     | 165 |     |     |     |     | 170 |     |     |     |     |     | 175 |     |     |  |  |  |  |
| cgg | gaa | acg | ttt | cca | tcc | ttc | ttc | cgc | aca | gtg | ccc | agt | gac | cgg | gtg | 576 |  |  |  |  |
| Arg | Glu | Thr | Phe | Pro | Ser | Phe | Phe | Arg | Thr | Val | Pro | Ser | Asp | Arg | Val |     |  |  |  |  |
|     |     |     | 180 |     |     |     |     | 185 |     |     |     |     | 190 |     |     |     |  |  |  |  |
| cag | ctg | cag | gca | gtt | gtg | act | ctg | ttg | cag | aac | ttc | agc | tgg | aac | tgg | 624 |  |  |  |  |
| Gln | Leu | Gln | Ala | Val | Val | Thr | Leu | Leu | Gln | Asn | Phe | Ser | Trp | Asn | Trp |     |  |  |  |  |
|     |     | 195 |     |     |     |     | 200 |     |     |     |     | 205 |     |     |     |     |  |  |  |  |
| gtg | gcc | gcc | tta | ggg | agt | gat | gat | gac | tat | ggc | cgg | gaa | ggg | ctg | agc | 672 |  |  |  |  |
| Val | Ala | Ala | Leu | Gly | Ser | Asp | Asp | Asp | Tyr | Gly | Arg | Glu | Gly | Leu | Ser |     |  |  |  |  |
|     | 210 |     |     |     |     | 215 |     |     |     |     | 220 |     |     |     |     |     |  |  |  |  |
| atc | ttt | tct | agt | ctg | gcc | aat | gca | cga | ggg | atc | tgc | atc | gca | cat | gag | 720 |  |  |  |  |
| Ile | Phe | Ser | Ser | Leu | Ala | Asn | Ala | Arg | Gly | Ile | Cys | Ile | Ala | His | Glu |     |  |  |  |  |
|     | 225 |     |     |     | 230 |     |     |     | 235 |     |     |     |     |     | 240 |     |  |  |  |  |
| ggc | ctg | gtg | cca | caa | cat | gac | act | agt | ggc | caa | cag | ttg | ggc | aag | gtg | 768 |  |  |  |  |
| Gly | Leu | Val | Pro | Gln | His | Asp | Thr | Ser | Gly | Gln | Gln | Leu | Gly | Lys | Val |     |  |  |  |  |
|     |     |     | 245 |     |     |     |     |     | 250 |     |     |     |     | 255 |     |     |  |  |  |  |
| ctg | gat | gta | cta | cgc | caa | gtg | aac | caa | agt | aaa | gta | caa | gtg | gtg | gtg | 816 |  |  |  |  |
| Leu | Asp | Val | Leu | Arg | Gln | Val | Asn | Gln | Ser | Lys | Val | Gln | Val | Val | Val |     |  |  |  |  |
|     |     |     | 260 |     |     |     | 265 |     |     |     |     |     | 270 |     |     |     |  |  |  |  |
| ctg | ttt | gcc | tct | gcc | cgt | gct | gtc | tac | tcc | ctt | ttt | agt | tac | agc | atc | 864 |  |  |  |  |
| Leu | Phe | Ala | Ser | Ala | Arg | Ala | Val | Tyr | Ser | Leu | Phe | Ser | Tyr | Ser | Ile |     |  |  |  |  |
|     |     | 275 |     |     |     |     | 280 |     |     |     |     | 285 |     |     |     |     |  |  |  |  |
| cat | cat | ggc | ctc | tca | ccc | aag | gta | tgg | gtg | gcc | agt | gag | tct | tgg | ctg | 912 |  |  |  |  |
| His | His | Gly | Leu | Ser | Pro | Lys | Val | Trp | Val | Ala | Ser | Glu | Ser | Trp | Leu |     |  |  |  |  |
|     |     | 290 |     |     |     | 295 |     |     |     |     | 300 |     |     |     |     |     |  |  |  |  |
| aca | tct | gac | ctg | gtc | atg | aca | ctt | ccc | aat | att | gcc | cgt | gtg | ggc | act | 960 |  |  |  |  |
| Thr | Ser | Asp | Leu | Val | Met | Thr | Leu | Pro | Asn | Ile | Ala | Arg | Val | Gly | Thr |     |  |  |  |  |
|     | 305 |     |     |     | 310 |     |     |     |     | 315 |     |     |     |     | 320 |     |  |  |  |  |



|   |      |
|---|------|
| gtg ctt ggg ttt ttg cag cgg ggt gcc cta ctg cct gaa ttt tcc cat | 1008 |
| Val Leu Gly Phe Leu Gln Arg Gly Ala Leu Leu Pro Glu Phe Ser His |      |
| 325 330 335   |      |
| tat gtg gag act cac ctt gcc ctg gcc gct gac cca gca ttc tgt gcc | 1056 |
| Tyr Val Glu Thr His Leu Ala Leu Ala Ala Asp Pro Ala Phe Cys Ala |      |
| 340 345 350   |      |
| tca ctg aat gcg gag ttg gat ctg gag gaa cat gtg atg ggg caa cgc | 1104 |
| Ser Leu Asn Ala Glu Leu Asp Leu Glu Glu His Val Met Gly Gln Arg |      |
| 355 360 365   |      |
| tgt cca cgg tgt gac gac atc atg ctg cag aac cta tca tct ggg ctg | 1152 |
| Cys Pro Arg Cys Asp Asp Ile Met Leu Gln Asn Leu Ser Ser Gly Leu |      |
| 370 375 380   |      |
| ttg cag aac cta tca gct ggg caa ttg cac cac caa ata ttt gca acc | 1200 |
| Leu Gln Asn Leu Ser Ala Gly Gln Leu His His Gln Ile Phe Ala Thr |      |
| 385 390 395 400   |      |
| tat gca gct gtg tac agt gtg gct caa gcc ctt cac aac acc cta cag | 1248 |
| Tyr Ala Ala Val Tyr Ser Val Ala Gln Ala Leu His Asn Thr Leu Gln |      |
| 405 410 415   |      |
| tgc aat gtc tca cat tgc cac gta tca gaa cat gtt cta ccc tgg cag | 1296 |
| Cys Asn Val Ser His Cys His Val Ser Glu His Val Leu Pro Trp Gln |      |
| 420 425 430   |      |
| ctc ctg gag aac atg tac aat atg agt ttc cat gct cga gac ttg aca | 1344 |
| Leu Leu Glu Asn Met Tyr Asn Met Ser Phe His Ala Arg Asp Leu Thr |      |
| 435 440 445   |      |
| cta cag ttt gat gct gaa ggg aat gta gac atg gaa tat gac ctg aag | 1392 |
| Leu Gln Phe Asp Ala Glu Gly Asn Val Asp Met Glu Tyr Asp Leu Lys |      |
| 450 455 460   |      |
| atg tgg gtg tgg cag agc cct aca cct gta tta cat act gtg ggc acc | 1440 |
| Met Trp Val Trp Gln Ser Pro Thr Pro Val Leu His Thr Val Gly Thr |      |
| 465 470 475 480   |      |
| ttc aac ggc acc ctt cag ctg cag cag tct aaa atg tac tgg cca ggc | 1488 |
| Phe Asn Gly Thr Leu Gln Leu Gln Gln Ser Lys Met Tyr Trp Pro Gly |      |
| 485 490 495   |      |
| aac cag gtg cca gtc tcc cag tgt tcc cgc cag tgc aaa gat ggc cag | 1536 |
| Asn Gln Val Pro Val Ser Gln Cys Ser Arg Gln Cys Lys Asp Gly Gln |      |
| 500 505 510   |      |
| gtt cgc cga gta aag ggc ttt cat tcc tgc tgc tat gac tgc gtg gac | 1584 |
| Val Arg Arg Val Lys Gly Phe His Ser Cys Cys Tyr Asp Cys Val Asp |      |
| 515 520 525   |      |
| tgc aag gcg ggc agc tac cgg aag cat cca gat gac ttc acc tgt act | 1632 |
| Cys Lys Ala Gly Ser Tyr Arg Lys His Pro Asp Asp Phe Thr Cys Thr |      |
| 530 535 540   |      |
| cca tgt aac cag gac cag tgg tcc cca gag aaa agc aca gcc tgc tta | 1680 |
| Pro Cys Asn Gln Asp Gln Trp Ser Pro Glu Lys Ser Thr Ala Cys Leu |      |

| 545   | 550 | 555 | 560 |      |
|---|-----|-----|-----|------|
| cct cgc agg ccc aag ttt ctg gct tgg ggg gag cca gtt gtg ctg tca |     |     |     | 1728 |
| Pro Arg Arg Pro Lys Phe Leu Ala Trp Gly Glu Pro Val Val Leu Ser | 565 | 570 | 575 |      |
| ctc ctc ctg ctg ctt tgc ctg gtg ctg ggt cta gca ctg gct gct ctg |     |     |     | 1776 |
| Leu Leu Leu Leu Leu Cys Leu Val Leu Gly Leu Ala Leu Ala Ala Leu | 580 | 585 | 590 |      |
| ggg ctc tct gtc cac cac tgg gac agc cct ctt gtc cag gcc tca ggt |     |     |     | 1824 |
| Gly Leu Ser Val His His Trp Asp Ser Pro Leu Val Gln Ala Ser Gly | 595 | 600 | 605 |      |
| ggc tca cag ttc tgc ttt ggc ctg atc tgc cta ggc ctc ttc tgc ctc |     |     |     | 1872 |
| Gly Ser Gln Phe Cys Phe Gly Leu Ile Cys Leu Gly Leu Phe Cys Leu | 610 | 615 | 620 |      |
| agt gtc ctt ctg ttc cca ggg cgg cca agc tct gcc agc tgc ctt gca |     |     |     | 1920 |
| Ser Val Leu Leu Phe Pro Gly Arg Pro Ser Ser Ala Ser Cys Leu Ala | 625 | 630 | 635 | 640  |
| caa caa cca atg gct cac ctc cct ctc aca ggc tgc ctg agc aca ctc |     |     |     | 1968 |
| Gln Gln Pro Met Ala His Leu Pro Leu Thr Gly Cys Leu Ser Thr Leu | 645 | 650 | 655 |      |
| ttc ctg caa gca gct gag acc ttt gtg gag tct gag ctg cca ctg agc |     |     |     | 2016 |
| Phe Leu Gln Ala Ala Glu Thr Phe Val Glu Ser Glu Leu Pro Leu Ser | 660 | 665 | 670 |      |
| tgg gca aac tgg cta tgc agc tac ctt cgg gga ctc tgg gcc tgg cta |     |     |     | 2064 |
| Trp Ala Asn Trp Leu Cys Ser Tyr Leu Arg Gly Leu Trp Ala Trp Leu | 675 | 680 | 685 |      |
| gtg gta ctg ttg gcc act ttt gtg gag gca gca cta tgt gcc tgg tat |     |     |     | 2112 |
| Val Val Leu Leu Ala Thr Phe Val Glu Ala Ala Leu Cys Ala Trp Tyr | 690 | 695 | 700 |      |
| ttg aac gct ttc cca cca gag gtg gtg aca gac tgg tca gtg ctg ccc |     |     |     | 2160 |
| Leu Asn Ala Phe Pro Pro Glu Val Val Thr Asp Trp Ser Val Leu Pro | 705 | 710 | 715 | 720  |
| aca gag gta ctg gag cac tgc cac gtg cgt tcc tgg gtc agc ctg ggc |     |     |     | 2208 |
| Thr Glu Val Leu Glu His Cys His Val Arg Ser Trp Val Ser Leu Gly | 725 | 730 | 735 |      |
| ttg gtg cac atc acc aat gca atg tta gct ttc ctc tgc ttt ctg ggc |     |     |     | 2256 |
| Leu Val His Ile Thr Asn Ala Met Leu Ala Phe Leu Cys Phe Leu Gly | 740 | 745 | 750 |      |
| act ttc ctg gta cag agc cag cct ggc cgc tac aac cgt gcc cgt ggt |     |     |     | 2304 |
| Thr Phe Leu Val Gln Ser Gln Pro Gly Arg Tyr Asn Arg Ala Arg Gly | 755 | 760 | 765 |      |
| ctc acc ttc gcc atg cta gct tat ttc atc acc tgg gtc tct ttt gtg |     |     |     | 2352 |
| Leu Thr Phe Ala Met Leu Ala Tyr Phe Ile Thr Trp Val Ser Phe Val | 770 | 775 | 780 |      |

```

ccc ctc ctg gcc aat gtg cag gtg gcc tac cag cca gct gtg cag atg      2400
Pro Leu Leu Ala Asn Val Gln Val Ala Tyr Gln Pro Ala Val Gln Met
785              790              795              800

```

ccc aag tgc tat gtg ctt ctt tgg ctg cca aag ctc aac acc cag gag 2496  
Pro Lys Cys Tyr Val Leu Leu Trp Leu Pro Lys Leu Asn Thr Gln Glu  
820 825 830

ggt ggt gag gca gct cag gga cac aat gaa tga 2577  
Gly Gly Glu Ala Ala Gln Gly His Asn Glu  
850 855

<220>  
<223> Synthetic

|        |            |
|--------|------------|
| <210>  | 20         |
| <211'> | 38         |
| <212>  | DNA        |
| <213>  | Artificial |

```
<400> 20
gcattacgat gcggccgctc aggtagtgcc gcagcgcc 38
```

<220>  
<223> Synthetic

<211> 40  
<212> DNA  
<213> Artificial

<220>  
<223> Synthetic

<400> 22  
gcattacgat gcggccgcct agctcttcct catcgtgtag

40

<210> 23  
<211> 29  
<212> DNA  
<213> Artificial

<220>  
<223> Synthetic

<400> 23  
ggaattcatg ccagctttgg ctatcatgg

29

<210> 24  
<211> 41  
<212> DNA  
<213> Artificial

<220>  
<223> Synthetic

<400> 24  
gcattacgat gcggccgctc attcattgtg ttcttgagct g

41